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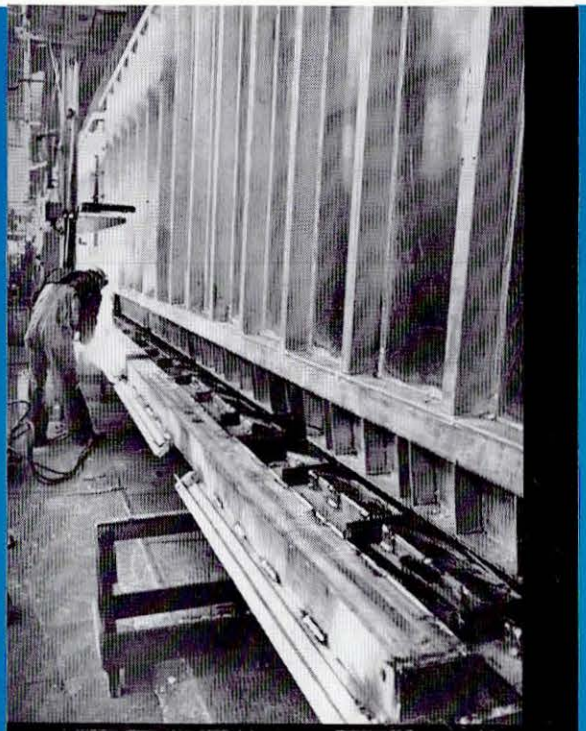
Toronto's new transit shops nearing **full operation** in time for line opening p. 31

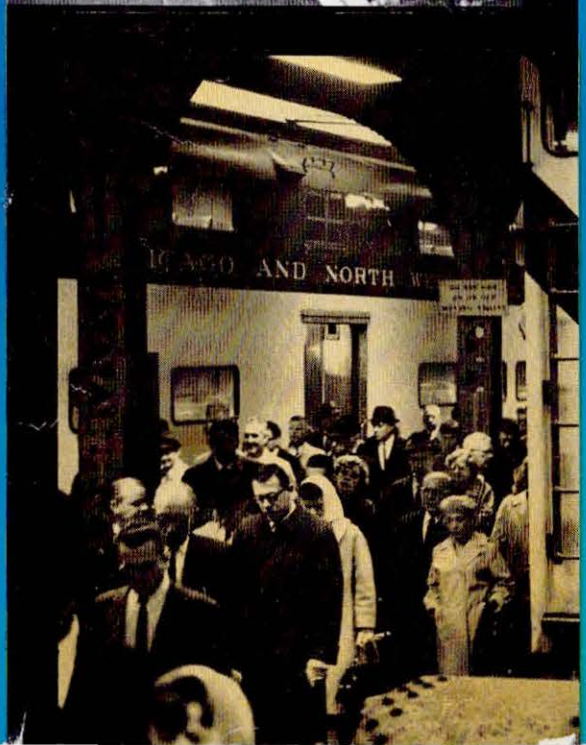
December 6, 1965

RAILWAY AGE WEEKLY

Burlington builds aluminum hoppers

p. 28





C&NW's approach to mass transport

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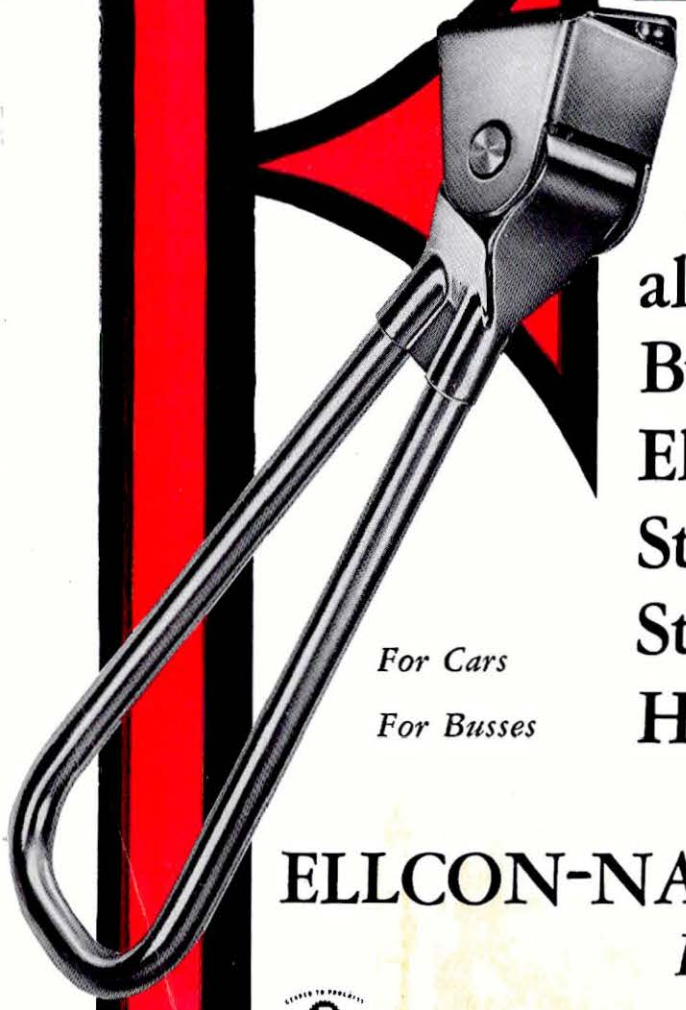

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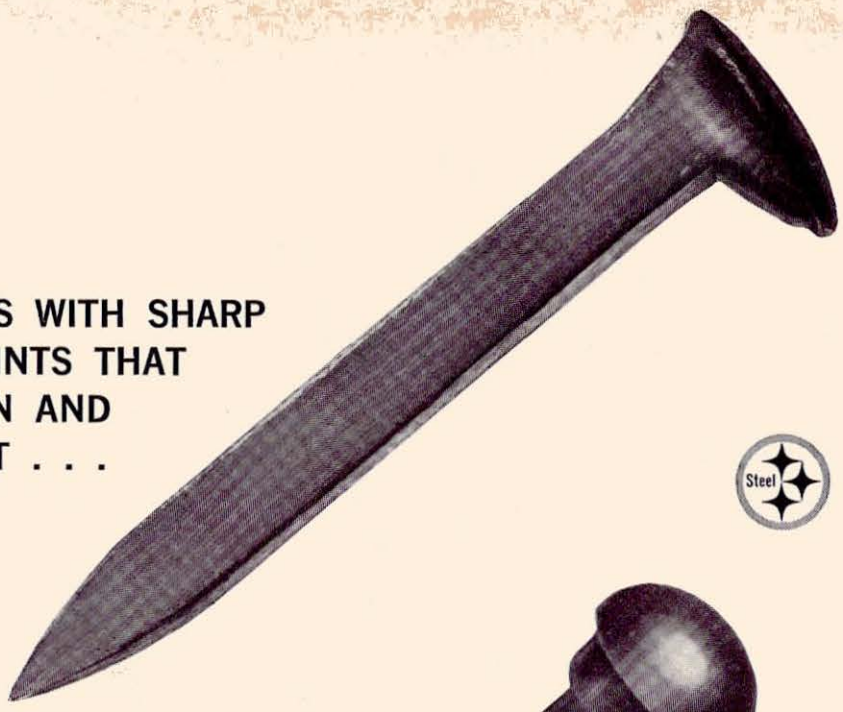

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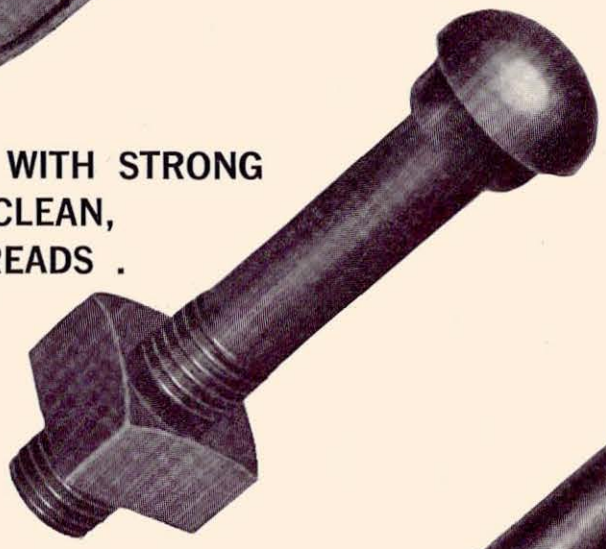

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RAILWAY AGE WEEK AT A GLANCE

December 6, 1965 • Vol. 159, No. 22

A new, fast turbine train

United Aircraft has unveiled its design for a 160-mph train for the Washington-New York-Boston run **p.11**

Boston's rebel with a rapid transit cause

Oilman Robert Jenney, a long-time champion for balanced transportation, is now enjoying a big victory **p.27**

CB&Q builds aluminum cars

The new covered hoppers will operate as two 70-car unit coal trains **p.28**

Toronto's new transit shops

Expansion of the city's transit-car fleet requires larger shop facilities **p.31**

C&NW's approach to mass transit

Harold A. Lenske describes his road's role in the commuter revolution **p.34**

New track machine needs less manpower

The redesigned Mannix Undercutter-Cleaner works at a rate 20% faster than its predecessor's **p.38**

The Action Page: Mass transport—opportunity for railroads

The nation's mass-transit needs offer great scope for the experts: U.S. railroaders **p.64**

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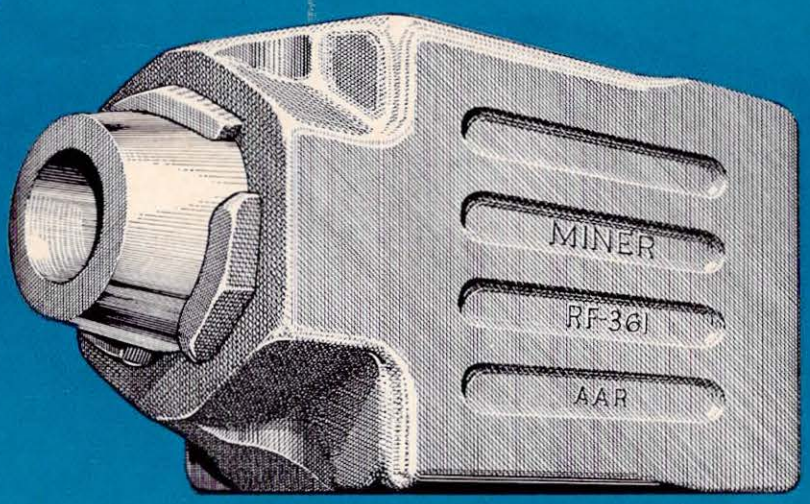

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SHORT AND SIGNIFICANT

Kohl to join transit association on Jan. 1

John C. Kohl, assistant administrator for transportation of the Federal Housing and Home Finance Agency, under Dr. Robert C. Weaver, will leave that post Jan. 1 to join the American Transit Association as executive vice president. He will succeed George W. Anderson, who retired early this year. The 84-year-old ATA will move its headquarters from New York City to Washington, D.C. next Feb. 1. Kohl has served under Dr. Weaver in administering the federal mass transport program. He will be guiding ATA, said the association's president, Edgar A. Claffey, "at a time when the mass transit industry plans to spend more than $10 billion during the next 10 years."

AAR, GE and PRR to begin ACI test in January 1966

A 70-car unit coal train and its locomotive will play a key role in an AAR-sponsored test of General Electric Company automatic car identification equipment. All of the cars will have three letters and six digits for identification. Each car and the locomotive will carry an inert radio-frequency antenna. Pick up will be from fixed interrogating and receiving antennas mounted between track rails. Readout equipment will be installed at Spruce Tower, 15 miles east of Altoona, Pa. Readings will be sent via wire line to Nola Yard near Harrisburg, where readout will be on punched tape.

ICC advised Atlantic port rates can differ

The ICC has been advised that different rates through Atlantic ports are not precluded by the U.S. Supreme Court's 1963 decision condemning differentials in favor of the Southern tier ports. The advice came from Examiner Richard S. Ries, who recommends, in I&S No. 8125, Commission approval of reduced rates on paper moving through Baltimore and condemnation of like rates proposed for movements through North Atlantic ports. The examiner would thus uphold the contention of Baltimore roads that the court ruling permits maintenance through any of the competing ports of non-parity rates which can be justified as reasonably compensatory.

Ten-year car spending put at $12 billion

Railroads will take delivery of new freight cars valued at $1.15 billion in 1966, predicts F. J. Schroeder, chairman of the American Railway Car Institute. And that, says Schroeder, will be only a beginning. During the decade beginning in 1966, investment in new cars will average $1.2 billion a year, he told a meeting of carbuilders and component suppliers at New York's Harvard Club Dec. 2. By the end of the decade, said Schroeder, purchases may rise to the $1.5-billion-a-year level. As for present trends, Schroeder commented: "We wound up 1964 with a backlog of car orders totaling a half-billion dollars. We're going to finish this year with a backlog of three-quarters of a billion dollars. That's a year-to-year rise of 50%."

Santa Fe has its say on merger of UP and RI

Merger of Union Pacific and Rock Island and the sale of part of RI to Southern Pacific is "fundamentally unsound" and not in the public interest, Santa Fe charged last week. In a brochure aimed at winning support from shippers and other interested parties, ATSF played up its "constructive alternative": Control of RI by Chicago & North Western and the subsequent purchase of a part of RI by Santa Fe. At least four separate brochures are now making the rounds in the hotly contested case, which isn't due for initial hearings until next March.

MONDAY MORNING REPORT

Remote control: Learning from the youngsters

The imagination and technology that enables youngsters to control electric trains and model airplanes are finding acceptance on full-size railroads and in industrial plants. The technology is remote control—specifically radio control. Imagination comes into play in applying the techniques where they will be most advantageous. What remote control does for the youngster it can do for the man: put him in a safe position to best oversee the work to be done.

Improved safety—reduced costs

Major benefits of remote control are improved efficiency, improved safety and a reduction in operating expenses. These and other benefits were examined at one of the sessions of the 1965 National Safety Congress. It was brought out that radio control of an overhead crane can raise efficiency by 20% and reduce by 80% the loss and damage to loads handled. There can be a 50% reduction in operating expenses. These are not pie-in-the-sky projections; they are based on actual experience. Major cost reductions come from crew shrinkage. For example, with conventional controls the crew of a large overhead crane (10 tons capacity and upwards) will consist of a craneman and one or two floormen. This force can be reduced to the craneman or operator on the floor when providing him with radio controls. Also, it was pointed out that the reduction in the initial price of an overhead crane due to elimination of the cab on the crane bridge and conventional cab controls would provide enough savings to pay for radio controls.

Fail-safe operation

Radio control of cranes eliminates the need for hand signals between cab operator and the man on the floor. Thus, there are no misunderstood signals because of poor visibility. Radio control enables the floorman to move about, be in the safest, yet best-visibility location to spot lifts quickly and accurately. The floorman or operator is removed from hot, dusty, corrosive and smoky areas. Spring-return deadman controls on his radio transmitter assure positive control at all times. If he falls, or relaxes his grip, crane motions or operations come to a halt. The radio transmitter, weighing five pounds or less, is carried by the operator at his waist, usually supported by a belt or shoulder harness. One type of radio control unit has knobs of various sizes and shapes that permit the operator to wear gloves, yet retain touch identification of the controls.

How radios control switching locomotives

Many of the advantages cited for radio crane control apply equally to radio-controlled switching locomotives. There are probably 50 radio-controlled locomotives operating in the U.S. A typical operation is at a New Jersey industrial plant where three unmanned locomotives are directed by radio control over 15 miles of in-plant tracks. With a portable radio transmitter, carried at his waist, one man directs the operation of a locomotive. Additionally, he throws switches, walks onto crossings to flag approaching traffic before moving the train over the crossing, spot cars, uncouples cars and rides the locomotive into storage tracks.

Communication is the controlling factor

The potential of radio remote control is great. Says John W. Hansen, manager-sales planning, Union Switch & Signal division of WABCO: "If we can communicate with it, we can control it." And communicating with machines via radio is, in this space age, already old-hat.

General Electric designed and installed the country's largest private microwave system

MICROWAVE COMMUNICATION is the new dimension in fast, dependable railroad service. And Southern Railway, in its spirited determination to be of ever-increasing usefulness to customers, has in use along its lines today the nation's largest privately-owned industrial microwave system.

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Total cost of this modern, reliable, all-weather communications medium will be about $28 million. Southern looks on this as an *investment* in an even safer, even more efficient and reliable railway. Microwave speeds up our system of keeping tabs on the availability of equipment and on the movement of freight. It helps us *keep* freight moving on the demanding schedules our customers require. Overall, it means better, lower-cost, more useful service on Southern Railway.

Adapting new and better methods to railroad operations, or creating them ourselves, is putting "Southern's accent" where it belongs — on the things that help us increase our usefulness to customers. All in the South benefit.

D. W. Brosnan
PRESIDENT

Southern Railway System
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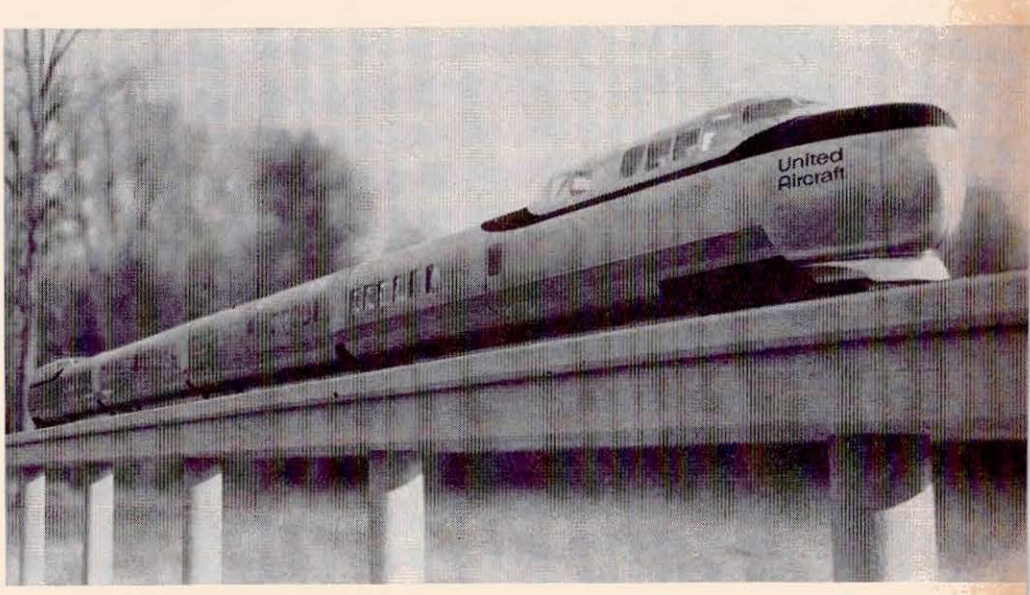
RAILWAY AGE WEEKLY
DECEMBER 6, 1965

A new, fast turbine train



United Aircraft's turbine train is the newest entry in the Northeast Corridor high-speed train race. It incorporates some unusual airplane-inspired features in its pendulum suspension and design.

United Aircraft Corporation, which for some months now has been working on new train designs behind closed laboratory doors at its Farmington, Conn., Corporate Systems Center, last week showed off a model of a lightweight, 160-mph train that uses gas-turbine engines and has an aircraft design.

The train is the company's entry in the Department of Commerce competition for a new fast-train for runs between Washington, New York and Boston in the Northeast Corridor. It's also being proposed for a new high-speed service on the New Haven between Hartford and New York.

United Aircraft officials said that their train, which would be capable of speeds between 120 and 160-mph on existing trackage, would be able to cut an hour off the present 3 hours and 35 minutes running time between Washington and New York. It would be able to make the New York to Boston run in three hours, lopping an hour and 15 minutes off the present schedule, they said.

At a press showing in Hartford, Gov. John Dempsey and officials of the Connecticut Transportation Authority examined the United Aicraft model. The train, in a five-car version that would carry up to 250 passengers, has been proposed in connection with the Authority's plan to improve Hartford to New York service. The Authority has been offered three five-car trains on a lease or sale basis for the operation.

A spokesman for United Aircraft said the trains, if accepted, could be delivered in 15 months. The aircraft company reportedly would sub-contract work on the cars to an existing car builder. Talks between United and some car builders on the subject have been going on.

● **Advantages listed.** In describing what the train could do, the company ran through a list of pluses resulting primarily from its aerodynamic design, describing it as being "stronger, lighter, faster, quieter, smoother and cheaper to run than conventional trains."

The low-slung train can be built in lengths of from two to 11 cars, and in versions for intercity, commuter and rapid-transit operation. To keep weight down, the trains would be built of heavy guage aluminum instead of steel. And to cut wind resistance to a minimum, the exterior of the train would have an airplane-like, streamlined skin.

Power would come directly from turbines, through mechanical drive, or the engines could be linked to generators which would supply electricity to run the train by electrical traction motors. The train could also be operated on an electrified system.

● **Weight-conscious design.** United Aircraft said that its basic design philosophy in the turbine-powered train is the elimination of unnecessary weight.

"This is achieved," said Corporate Systems Center President Charles M. Kearns, Jr., "by using a lightweight power system built around compact engines only five feet long and a foot and a half in diameter, the use of single-axle suspension, and aluminum construction."

He explained that while major weight savings are made through design and elimination of various components, the structural designs actually provide great structural strength.

It was pointed out that because the trains are double ended there would be no need for switching or turnarounds, permitting a higher rate of equipment utilization.

Powerplants proposed for the train are specially modified models of the Pratt & Whitney Aircraft PT-6 free-turbine engine, designed and built by United Aircraft of Canada, Ltd. The engines are now used in helicopters and

WATCHING WASHINGTON WITH WALTER TAFT

TAFT

● **COST-EFFECTIVENESS APPRAISALS** of the type now used to allocate defense funds will influence the development of President Johnson's policy and programs in the transportation field. Alan S. Boyd, undersecretary of commerce for transportation, reported this recently to the Common Carrier Conference of Domestic Water Carriers.

The approach, which Boyd also called economic effectiveness, has resulted, he said, "in sharpening our military planning objectiveness, in the channeling of public funds into where defense objectives can be better obtained, and a greater over-all efficiency in our defense effort." The undersecretary noted that President Johnson has called upon all federal agencies "to improve their awareness of cost effectiveness," and to employ it in the development of policies and programs in non-defense areas.

BOYD EMPHASIZED that the Administration is not seeking change for its own sake. It will take new tacks only when they promise to develop the government's transport policy and program its transport investments "in ways that will increase the benefits to the public." The undersecretary went on to explain that such increased benefits should result when "better knowledge" determines the selection of projects "which can be tested against alternatives in practical ways."

ECONOMIC EFFECTIVENESS was listed by Boyd as a principal characteristic of the inland-water-carrier industry. He cited the industry's promotion of technological developments which have kept water rates down "in spite of the rising trend of costs in the economy as a whole." At the same time, however, he said the industry's progress has been due "in part, to government subsidy."

THE UNDERSECRETARY'S PITCH for the Administration's user-charge proposals then followed. President Johnson submitted these proposals to Congress last May and they are still pending before the House Committee on Ways and Means. As to waterways, they call for the institution of user charges with a two-cents-per-gallon tax on vessel fuel.

IMPROVED EFFECTIVENESS in the field of waterway project planning, Boyd said, must come in two areas—the planning process itself, and in the policy of reimbursement. He thinks past progress in planning owes much to the government's reimbursement policies, noting that such policies apply to water-power and water-use projects. The existence of reimbursement in those fields "has provided an incentive for the close study of costs and benefits," Boyd explained.

TRANSPORTATION "has not been one of the reimbursable functions in water resource planning," as the undersecretary next pointed out. He went on to state again "the Administration's policy that water transportation should join the family of reimbursable functions in water resources programs." And, "in plain language, this means user charges."

PROBLEMS of transition to the user-charge basis were considered by the Administration when it decided on the two-cents-per-gallon tax, Boyd said. He explained that this form of levy eases the problem of administration because the government has had much experience with it. And while the Administration "is prepared to support its position" at hearings before the House Ways and Means Committee, it will "consider seriously the need for specific modifications which such hearings might bring out."

fixed-wing turbo-prop airplanes.

The turbine, weighing only 250 pounds, would be able to deliver up to 550 horsepower in its railroad application. Two to four power units would be placed in power dome cars, or a single turbine could be placed in each passenger car.

● **A swing train.** Because it's a product of aircraft-oriented designers, the United Aircraft rail equipment has some unconventional design features.

With a lower center of gravity than a conventional train (cars would be 2½ feet lower than standard rail cars) a pendulum-type suspension system, and guided axles, the trains would be able to bank around curves like an airplane. Cars would bank inwardly under the influence of centrifugal force as opposed to the outward motion in existing trains, making it more comfortable for passengers—who would feel the centrifugal force at the seat level rather than shoulder height.

Another feature that would enable the trains to take curves at speeds 30% faster than conventional trains is a system of guidance rods that are connected to the axles between each pair of cars to steer them around curves. This is expected to reduce flange wear and the tendency of conventional system to shimmy. ■

MIT transportation study calls for new transport form

An entirely new system of high-speed ground transportation that could move people along on cushions of air at more than 200 mph is feasible to create within the next 15 years.

This is the prime proposal in a 450-page report on ground transportation needs released last week by the Massachusetts Institute of Technology. The study was commissioned by the Department of Commerce.

MIT says the new system could carry passengers in "trains" on cushions of air in enclosed guideways or tunnels, "offering advantages not provided by existing systems." At least two years of research and development would be required before a decision could be reached to proceed, the report states, but such study would have to begin in this fiscal year.

The MIT report suggested that existing railroad, highway and airway networks might not be adequate to meet the demands of an expected 200% population increase by 1980.

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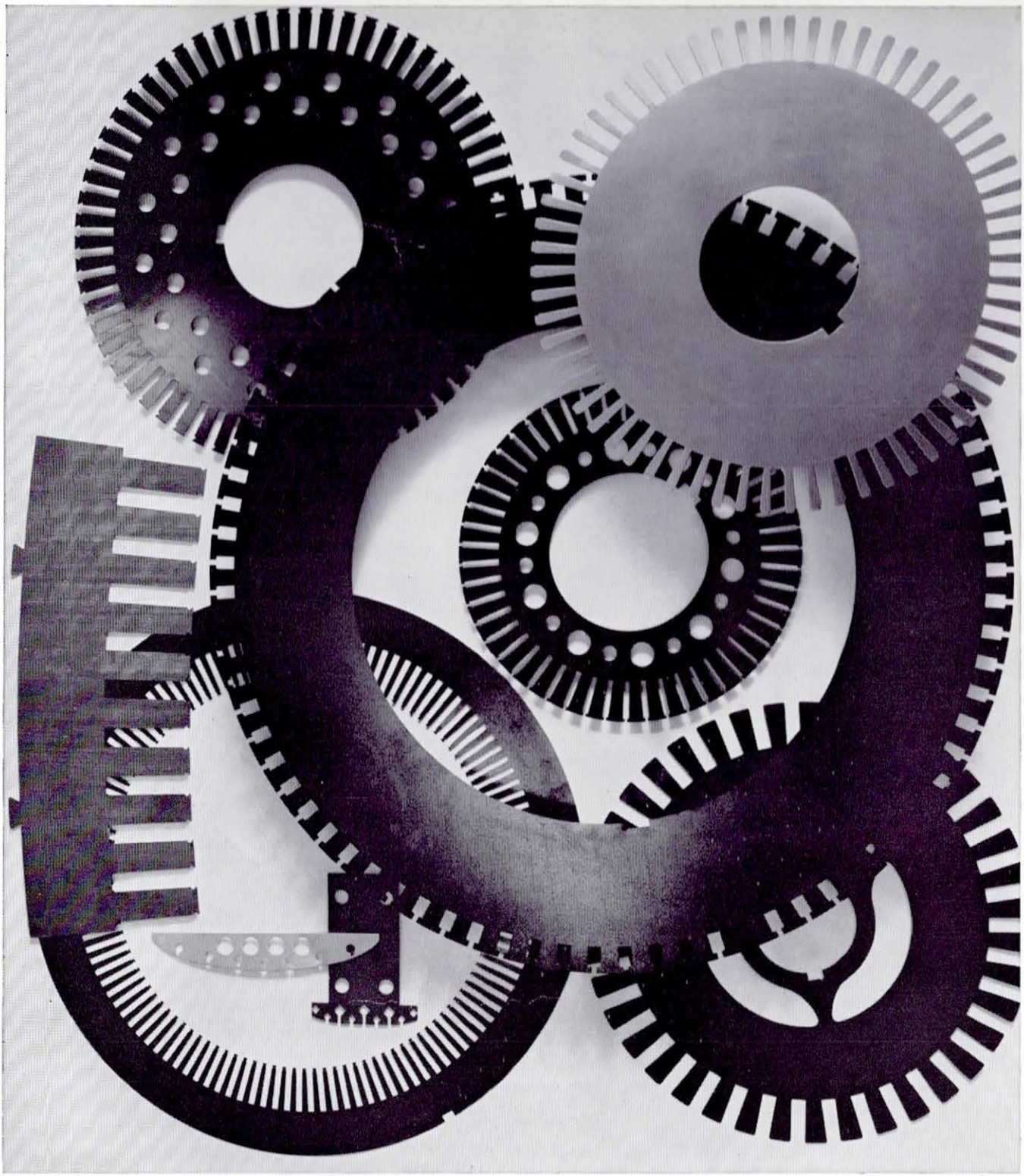

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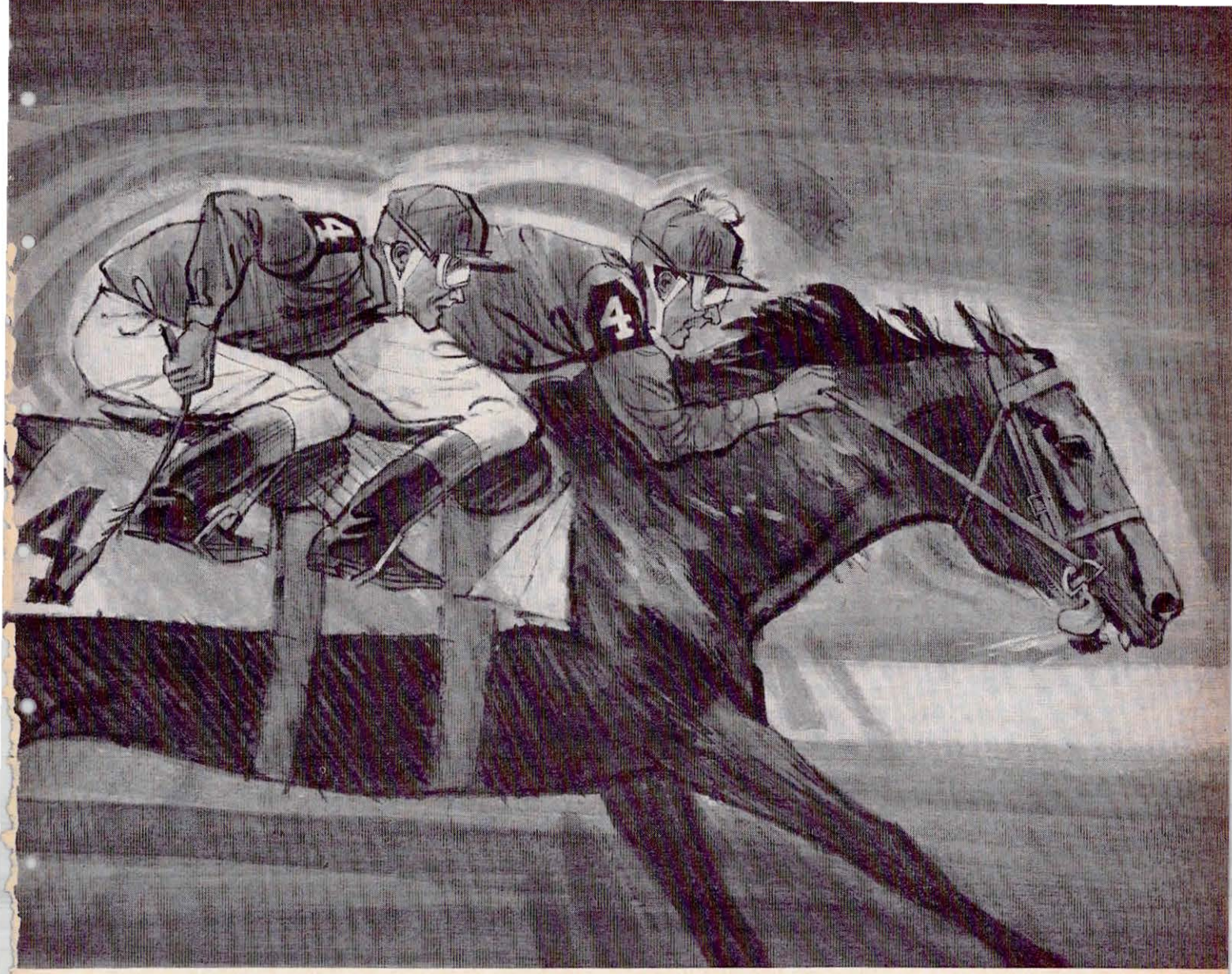

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Performance of one USS Tenelon Stainless Steel car leads to production of 10 more

In 1964, American Potash and Chemical Corporation leased a single USS TENELON Stainless Steel car from North American Car Corporation for hauling sodium chlorate. This is a high-quality chemical used for bleaching kraft pulp. It must be kept absolutely clean and free from contaminants. To accomplish this and to permit unloading as a slurry, the car was designed like a tank car but functions as a covered hopper.

The car was put into service and its performance carefully studied. Cleaning was found to be easy, and there was no maintenance on the car body. Operating results were so good that American Potash leased 10 more cars with a few modifications. Weight was reduced by 16,500 lbs., making the total weight only 50,600 lbs. This was done by reducing the thickness of the USS TENELON Stainless Steel plates to ¼". Also, tank compartments were reduced from three to two, and other design changes made. The gross tank capacity of the new design is 18,190 gallons or 212,400 lbs. . . . 190 gallons higher than the capacity of the original car.

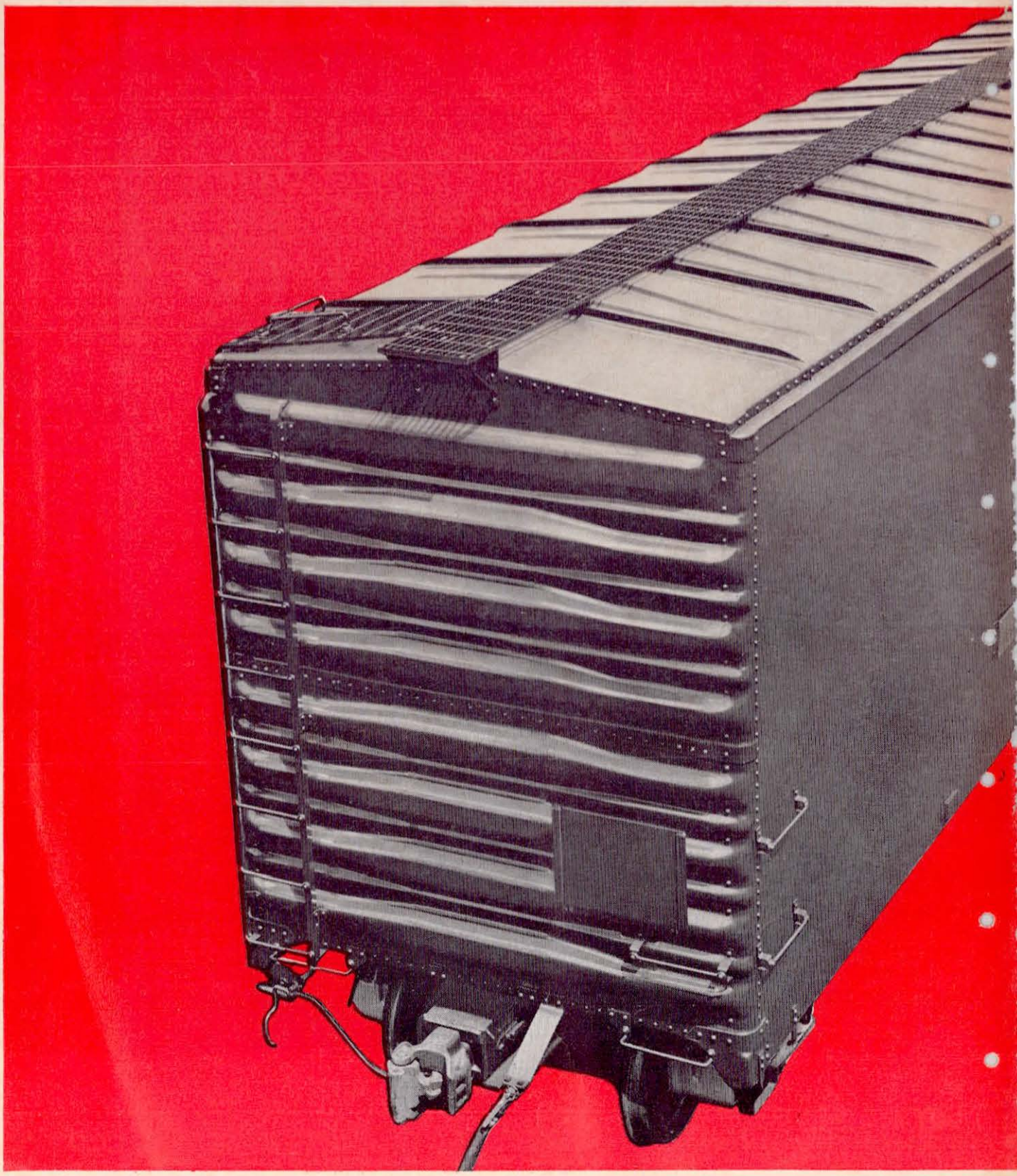
USS TENELON Stainless Steel is not only corrosion resistant but is also about twice as strong as conventional stainless steels. It has a smooth, attractive, lasting surface and requires no paint or maintenance, inside or out. You can haul such varied cargo as sugar, soda ash, rice, silica sand, or chemicals, without fear of contamination. Shippers and railroads like the quick turnaround time and the absence of maintenance costs on the car body.

For complete information on USS TENELON Stainless Steel, or the USS family of stronger steels for railroad cars, call the nearest USS District Sales Office or write United States Steel, Room 8593, 525 William Penn Place, Pittsburgh, Pennsylvania 15230.
USS and TENELON are registered trademarks.

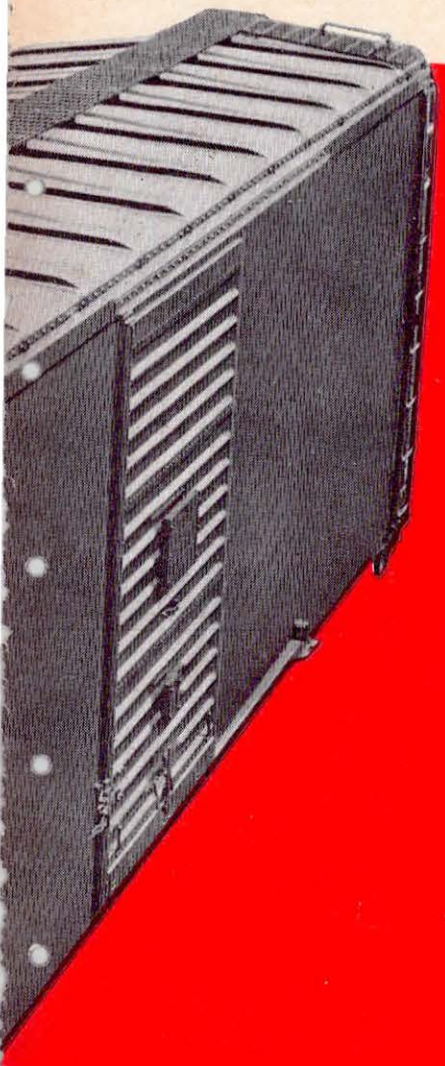
USS United States Steel: where the big idea is innovation

This mark tells you a product is made of steel.

Put Standard where the stress is,



and lengthen box car life



Standard Diagonal Panel Roof

The strongest design possible for its depth. Resistance to twisting stresses keeps the car frame square. Lasts the life of the car.

Standard Dreadnaught Ends

The patented corrugations of Standard Dreadnaught Ends provide the greatest resistance to shock and impact—add strength where it's needed most.

STANDARD RAILWAY EQUIPMENT
division of STANRAY CORPORATION
Hammond, Indiana • Chicago, Illinois • New York, New York

Circle 20 on reader service card

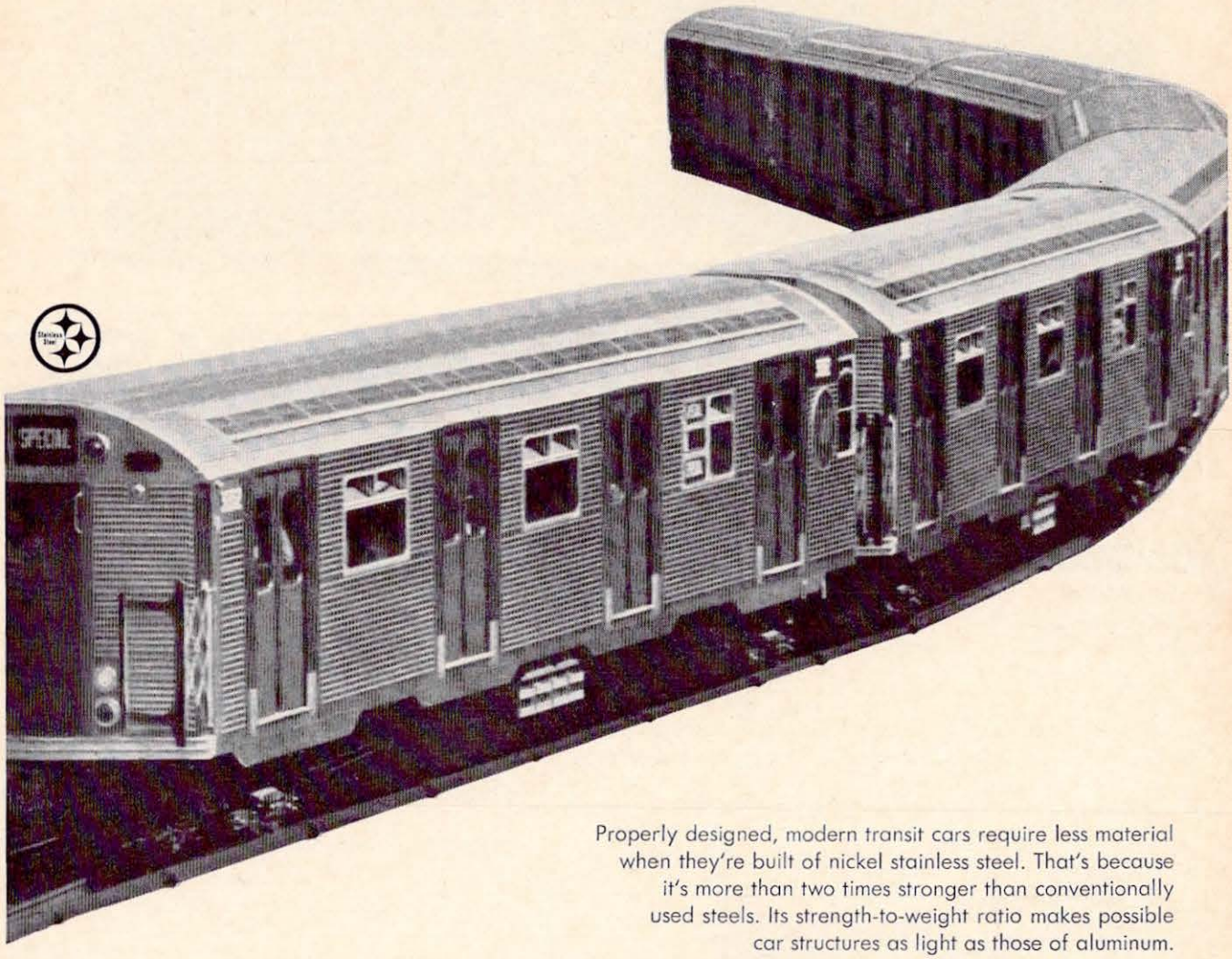
BESSEMER

FRED W. OKIE, PRESIDENT
Bessemer and Lake Erie Railroad

"There is no better way to start the week than to read Railway Age, and keep abreast of the news and the new ideas in our rapidly-changing industry. Honest appraisal of railroad news is a great help to the railroad supervisor."

As strong as cars of other materials, yet four tons lighter!

Because they're built of Nickel Stainless Steel.



Properly designed, modern transit cars require less material when they're built of nickel stainless steel. That's because it's more than two times stronger than conventionally used steels. Its strength-to-weight ratio makes possible car structures as light as those of aluminum.

In the case of New York City's new "Brightliners," the use of nickel stainless steel reduced the weight of each subway car by more than four tons and still maintained required strength. And this savings in weight means considerable savings in electric power costs—as much as $16,000 per car over a 35-year useful life.

Advantages such as these make nickel stainless steel ideally suited for use in modern transit cars. It assures commuters of safety and comfort and transit authorities of important economies of design and operation. Find out how nickel stainless steel can successfully work for your city's transit system. Write to Inco.

The International Nickel Company, Inc.
67 Wall Street, New York 5, N. Y.
Nickel... its contribution is Quality

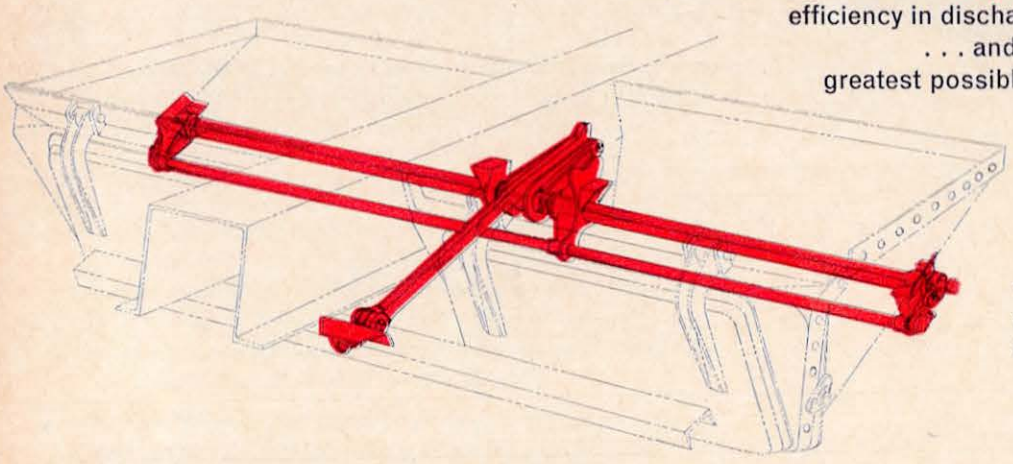
DO YOU NEED GREATER HOPPER CAR *utilization?*

ENTERPRISE

TYPE D LATCHES

offer you all of the advantages you are looking for...

. . . and now make it possible for you to answer today's demand for higher utilization of your hopper cars in integral trains . . . new, lower cost all-steel design Type D Latches—applicable to your general service standard hopper cars . . . suitable for 1-man operation of the doors in pairs from either side of the car . . . assure maximum safety, speed and efficiency in discharging coal or other bulk ladings . . . and allow fast turn-around and the greatest possible utilization of your equipment.



Type D Door Latches also provide for tight doors and maintenance-free operation . . .

. . . before adding any more cars to your fleet, take the time now to investigate Type D, the finest open hopper door latches available in the industry today—you'll be glad you did!

ENTERPRISE RAILWAY EQUIPMENT COMPANY / 8754 S. Dobson Ave., Chicago, Illinois 60619 / Area Code 312, Phone 221-4800

Office of International Operations: 1212 Pennsylvania Building/425 Thirteenth St., N.W., Washington, D.C. 20004, U.S.A.

GEARED TO PROGRESS P R I MEMBER

Circle 29 on reader service card

New breed GM locomotives will roll up one million miles before production

In early March of 1965, a black locomotive consist sat idling in the Santa Fe's Argentine yard waiting for orders. The units had a familiar profile, yet none of the yard crew could make a positive identification.

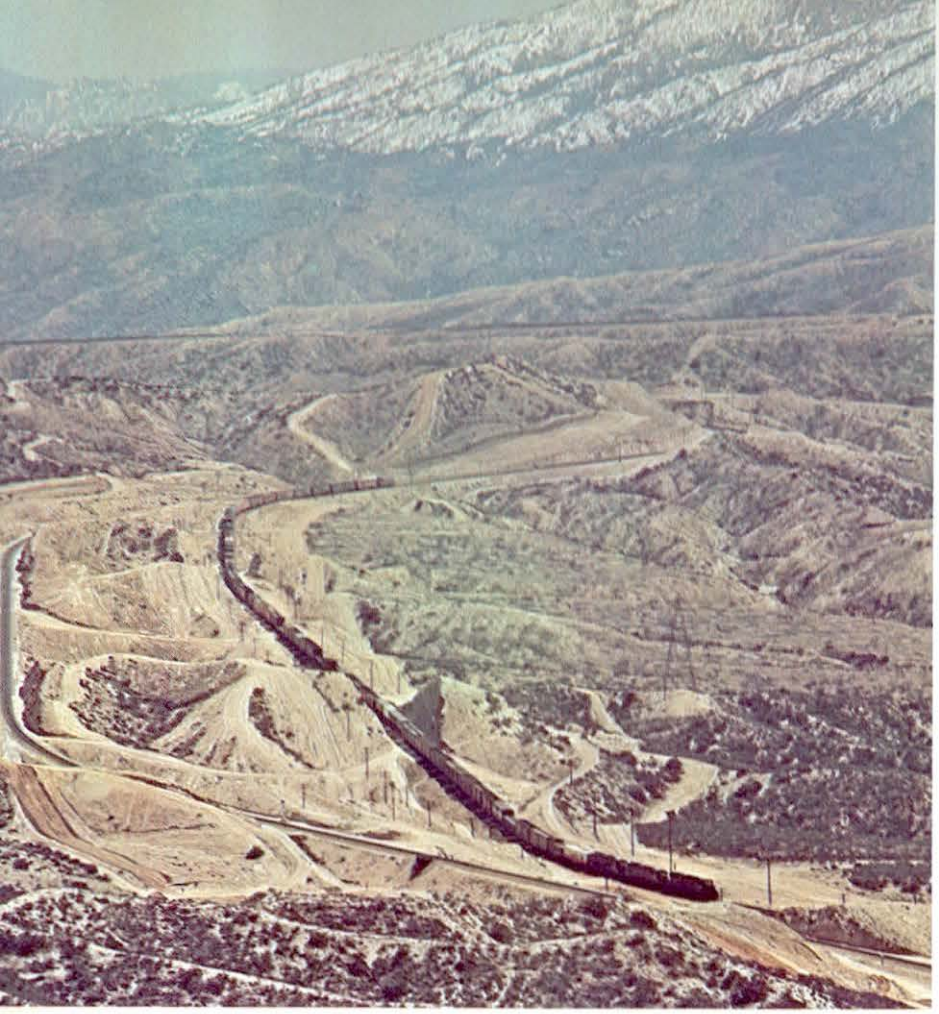
This was the beginning of the most rigorous and intensive shakedown program that any new line of locomotives has ever gone through. The new Electro-Motive Six Forty Five Fleet of nine locomotive models was ready for field trials.

Before a year had passed, 11 prototype locomotives would log over a million miles under every conceivable operating condition on nine different railroads across the country.

A two-part story

The real beginning of Electro-Motive's new locomotive line goes back several years when EMD engineers were starting lab tests on a

continued



new prime mover — the GM 645 Diesel engine. They put prototype engines in test cells to check combustion development, crankshaft behavior and precise stress during operation. Then, durability tests. The cycle was repeated over and over.

At the same time, work was progressing on the other new major components. A model of the AR-10 ac/dc generator was in service in an F-3 carbody. The D-77 traction motor with its new Kapton insulation had performed well in lab tests and was ready for field testing.

On the road with the test car

With months of rigorous lab testing behind them, all components were assembled for the real shakedown—on the rails pulling freight across the country. That's where the 11 EMD prototype units spent most of their time, usually followed by EMD's rolling test lab.

Electro-Motive engineers kept close watch during the runs, recording electronically the performance of every major locomotive part. They questioned environmental effects, wheel slip and throttle response. The test car's answers supplemented the months of lab research.

continued

From freezing mountain terrain to the dry heat of the desert, the prototypes were tested under all operating conditions.

Electro-Motive engineer checks electronic recording equipment in the rolling test lab.

Data is analyzed on the spot by the Electro-Motive test car staff, and stored for later use.

TEST CAR
EM

What testing has revealed

Since that first consist went out ten months ago, our Research Department has gathered enough data to fill a freight car. Overall results have surpassed even our engineers' optimistic expectations. The number of miles racked up by each unit stands as proof of the small number of problems encountered. All prototypes have successfully completed their assignments run after run, returning to LaGrange just long enough for evaluation.

Only the beginning

The new EMD locomotive models have reached the million mile mark in testing. But it's only the beginning. As our most advanced new units go to work for railroads in 1966, we'll continue our research program both on and off the rails . . . so you'll have an even better locomotive tomorrow.

ELECTRO-MOTIVE DIVISION
GENERAL MOTORS · LA GRANGE, ILLINOIS
HOME OF THE DIESEL LOCOMOTIVE
In Canada: General Motors Diesel Limited, London, Ontario

Los Angeles bound freight with prototypes at the headend crosses the parched country outside San Bernadino.

Train crews' reaction to the new power was enthusiastic during the test runs.

Electro-Motive test consist returns to the yards at San Bernadino after successfully completing this phase of schedule.

Boston's rebel with a transit cause

Robert Jenney's oil company makes its living from automobiles, but that hasn't stopped him from crusading for rail transit.

Boston's Robert Jenney—an oil man who's a rebel with a rapid-transit cause—is now enjoying his greatest victory in his long battle for balanced transportation in the Hub.

The victory for Jenney came Nov. 1 when the New Haven signed over its Old Colony line right of way to the Massachusetts Bay Transportation Authority. The MBTA plans to build a rail rapid-transit line along the controversial route between Boston and the South Shore.

Since 1959, after two years of state subsidy failed to keep the commuter route alive, the New Haven has used the line only for freight service. When it was abandoned, 11,000 commuters were forced onto the already crowded highways, and traffic has gotten worse since then. The Old Colony issue then became ensnared in politics, and efforts to have the state acquire the valuable 15-mile right of way for rapid transit died in the legislature 12 times.

Robert M. Jenney and a model of a proposed high-speed train (Budd's).

● **Enter Robert Jenney.** After watching with growing frustration the deteriorating transportation situation, Jenney decided it was time for some civic action.

He began by running a series of full-page ads in the Boston papers in an effort to dramatize the need for more rapid-transit service. One ad, which appeared just before Patriot's Day, showed Paul Revere and his horse unable to make his famous ride because of a hopeless traffic jam. Jenny kept up the campaign, running more ads, buying radio and television announcements, and speech-making.

"It seemed incredible to many people that an oil company, whose well-being is dependent on the sale of gasoline to motorists, would speak up for a balanced solution to our transportation problems. We spoke up because the economic health of our area was at stake."

Jenney and his family-owned Jenney Manufacturing Co., which has some 700 gas stations in New England, has had a stake in the area since 1812. The family's business was first in whale oil.

Jenney's interest in promoting balanced transportation has carried him to Washington for testimony before Congress on the Mass Transit bill, and later on the Northeast Corridor proposal. As chairman of the Boston Chamber of Commerce's transportation committee he helped put over legislation creating the Massachusetts Bay Transportation Authority—the agency that will build the hard-fought-for South Shore line.

Jenney doesn't see any incongruity or conflict of interests in the position he takes.

"It's as simple as this. If the traffic in Boston gets any worse, the whole city will strangle, ultimately. And if the city is strangled, business will suffer. And I'm a businessman and don't want my business to suffer."

Jenney said the company's activities in behalf of mass transit have not been received favorably everywhere. The local automobile club has been anything but pleased by Jenney's activities, and some of the company's gas credit card holders have returned their cards in pieces. But Jenney feels he has a job to do.

"With our roads becoming more congested all the time we feel we should do something about it. We really believe it's a disservice to our customers to tell them to go out and play in traffic."

The Jenney campaign has had its share of supporters, too. The Governor and many business and political leaders in the state have lauded his efforts, and there are always requests for his services as a speaker.

Jenney uses St. Louis as a good illustration of what can happen to a city and a region that ignores balanced transportation.

"From 1850 to 1870, during the important days of railroad building, not one railroad bridge crossed the Mississippi River to St. Louis. This was because St. Louis looked on itself as a river city and the waterway interests were so strong that they convinced the St. Louis community that it should depend on water transportation alone.

"As a result, trains had to terminate at East St. Louis. The freight was ferried across the Mississippi to St. Louis, and then reloaded onto trains to go on to Kansas City and the West. Consequently, St. Louis lost its transportation preeminence to Chicago and has never since regained it."

St. Louis' big mistake, he emphasizes, "was falling into the trap of looking at water versus rail instead of the over-all problem of mobility."

● **Building Boston a stadium.** A job that's getting a lot of Jenney's time and interest these days is his role as vice chairman of the Greater Boston Stadium Authority. Created by the Legislature, the Authority is planning to build the first major stadium (53,000 persons for football, 45,000 for baseball) in the world with a retractable roof. As a year-round, all-weather stadium, it has great appeal for winter-conscious New Englanders.

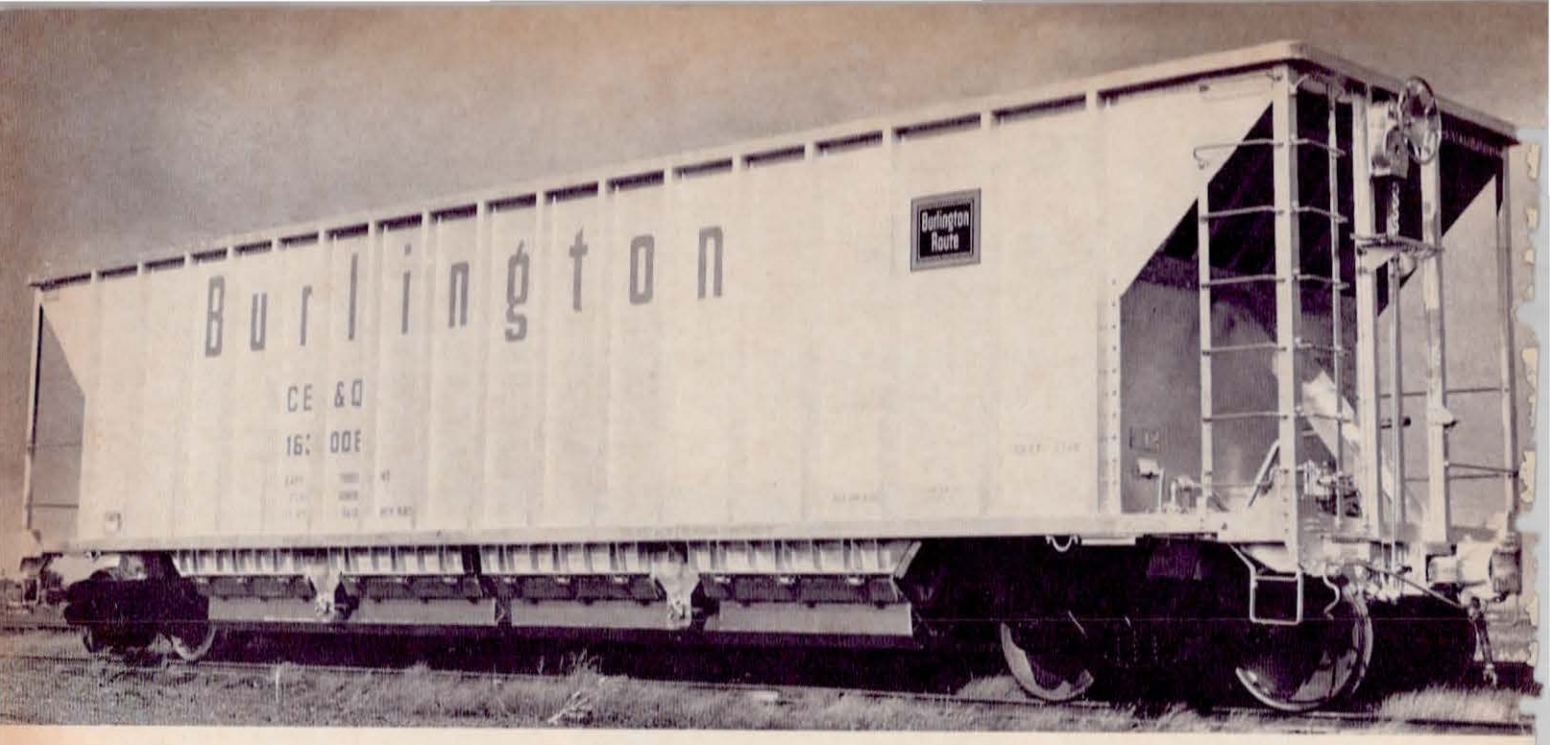
Adjoining the stadium at the proposed South Station site will be a 400-foot-diameter, 18,000-seat arena.

What excites Jenney about the project is that transportation-wise the undertaking is a natural. He sees the people of Boston and Massachusetts reaping a number of benefits from the Stadium Center.

"Without the city spending another penny, these transportation facilities can bring 7 million people a year to the new all-weather Stadium Center from all over the New England region. Not to take advantage of this opportunity to attract more people and to more fully utilize these priceless ready and available assets would be foolhardy, wasteful and shameful."

A born fighter for what he believes in, Jenney doesn't believe that getting the people's stadium up will be all smooth sailing.

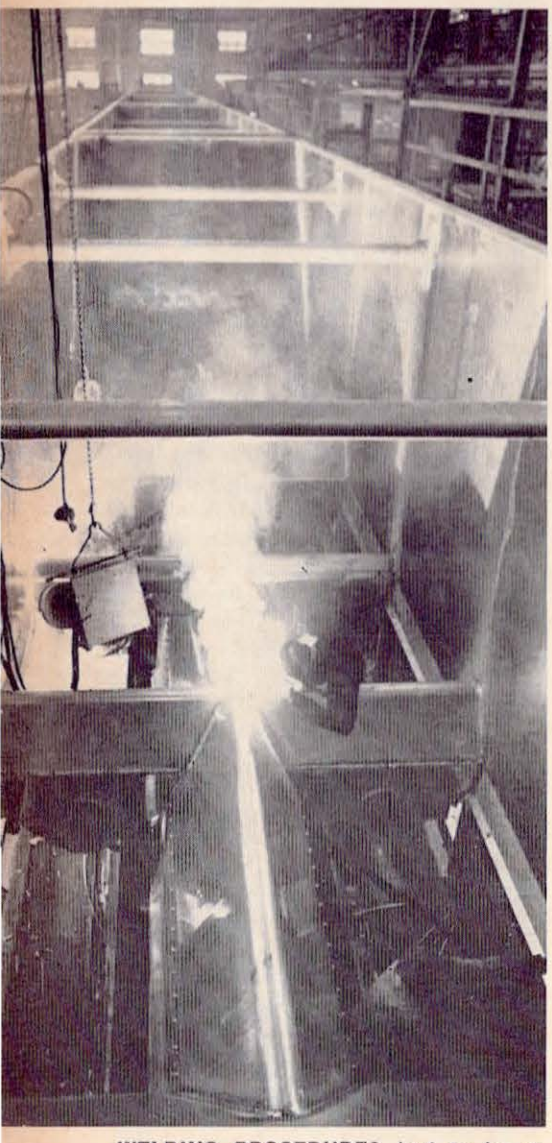
But the Stadium Center project will make it, he is confident. Meanwhile, he's already looking ahead to snaring the 1975 World's Fair for Boston. ■



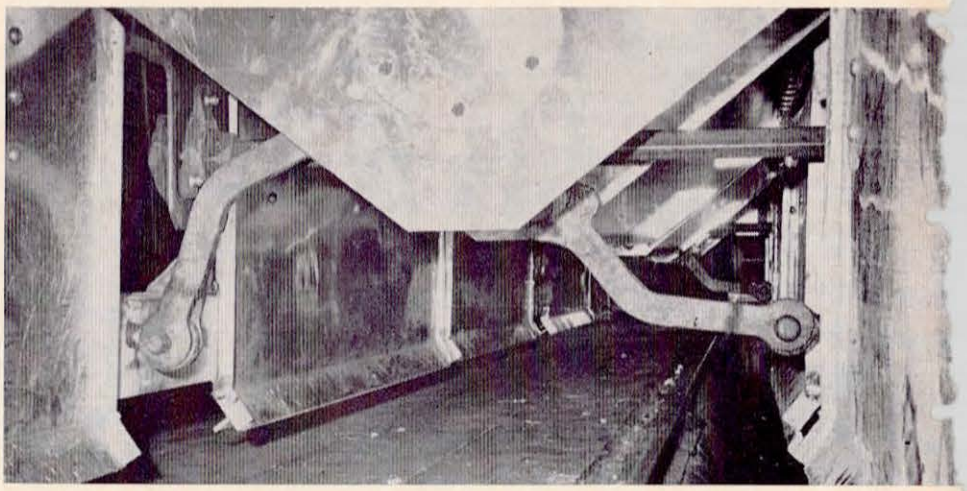
ASSEMBLY OF CAR involved welding and more than a thousand lockbolts and high-strength conventional bolts.

CB&Q builds aluminum cars

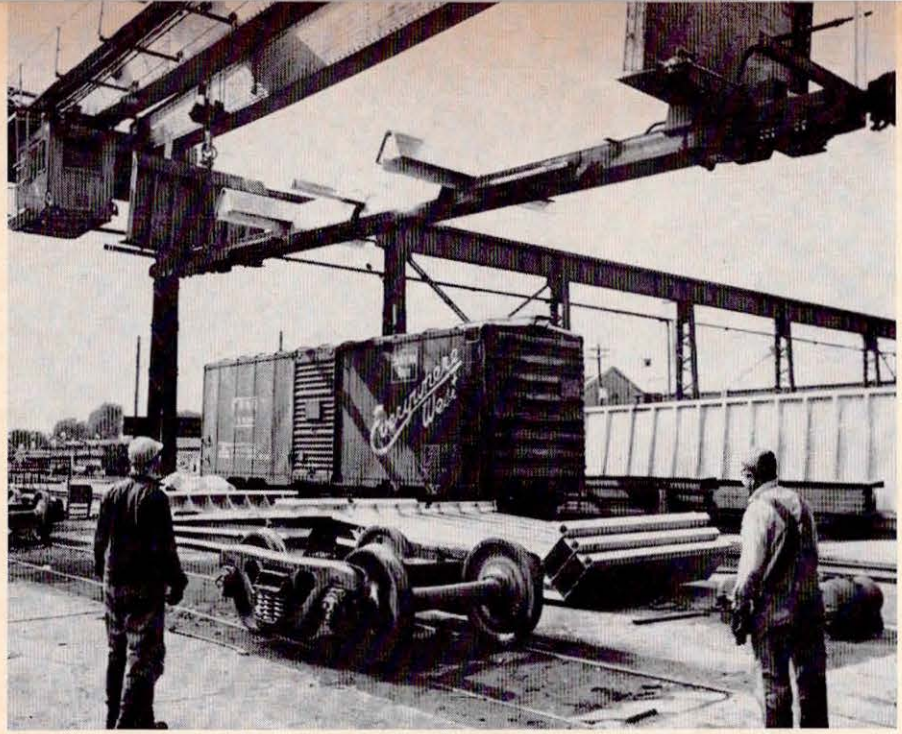
- **New hoppers, built at the road's Havelock, Neb., shop, are expected to produce $1 million a year from hauling coal.**
- **They will operate as two 70-car unit trains between a mine in southern Illinois and a generating station near St. Louis.**



WELDING PROCEDURES had to be revised for Havelock to work with aluminum.



DOORS IN OPEN POSITION show linkage and operating shafts. Doors are normally power operated, actuated from car side. There is provision for manual dumping.



STEEL UNDERFRAME is shown with aluminum transverse hoods in place.

Cooperation by coal producers, railroads and coal consumers can be of benefit to all involved. Such cooperation is exemplified by the recent carbuilding program of the Burlington. The road's Havelock, Neb., shop has just turned out 139 aluminum-body covered hopper cars, all of 105-ton capacity. Previously, the Burlington had built and tested two prototypes of the same general arrangement.

For the Burlington the new cars will soon be producing $1 million in freight revenues annually. For the Old Ben Coal Co.—the producer—there will be a new market for upwards of one million tons of coal each year. For Union Electric—the St. Louis-based utility—there will be a guaranteed fuel supply for its newest and largest generating station, delivered at low unit-train rates.

● **Two unit trains.** Assembled in two 70-car unit trains (including the prototype cars), the aluminum hoppers will be assigned to the transportation of coal over the 133 miles from a new mine at North Benton in southern Illinois to the Sioux generating station at Machens, Mo., about ten miles north of St. Louis on the Mississippi River. This utility plant reportedly will be the largest coal-fired steam-electric plant west of the Mississippi. By the time it is completed it will cost about $250 million.

The first generating unit of the Sioux station, rated at 525,000 kw, will be completed in May 1966 at a cost of $63.7 million. The unit-train operation to supply the station will ultimately be on a five-days-per-week basis with a 25-hour round trip for each train.

● **Lowered rates.** The present volume rate for coal from southern Illinois mines to the new plant is $2.98 per ton in 1,000-ton lots. The unit train's rate will be less than half this figure —$1.20 per ton. To qualify for the low rate, there must be at least 7,000 tons of coal in each train and a movement of at least one million tons annually.

Coal will be loaded at the mine from a 15,000-ton live storage through stationary hoppers into the cars at a rate of 3,600 tons per hour. The cars will be flood-loaded through two chutes which have sensing devices that automatically start and stop filling by opening and closing powered gates. The entire procedure can be handled by a single coal company employee.

Nine-hour trip

The train will move at a rate of 0.5 mph during the loading to synchronize with the coal conveying system. Loading will normally begin between 8 p.m. and midnight. In less than nine hours thereafter, the train will arrive at the Sioux plant.

For unloading, the train will enter a loop at the generating station and slow to 0.25 mph as it approaches a 120-foot dumping pit. Coal is fed from the six hoppers in this pit by vibrating feeders, controlled automatically to maintain a removal rate of 3,000 tons per hour. Dumping vales on diagonal corners of each car actuate the pneumatic door operating mechanism and are operated by a man at trackside.

● **Slow-speed control.** To solve the problems of maintaining the 0.5-mph and 0.25-mph speeds at the loading and unloading sites, the Burlington has developed a rheostat throttle control device much like that previously used on the road's hump locomotives. To regulate speed at any setting between 0.20 and 2 mph, the engineman will need only set a dial to the desired speed. Controls operating in conjunction with the diesel engine governor system then do the rest.

Why did the Burlington decide to build its unit-train cars with aluminum bodies, and why 100-ton cars? Many aspects of the aluminum car design were examined by the road's engineers. The cars would have to be able to carry at least 105 tons of coal to meet the volume freight rate based on 7,000 tons in each train. They could not be too big for clearances along the route, nor could the loaded cars be too heavy for any bridges or rail on the line.

● **Exhaustive study.** The Burlington's study of various types of high-capacity coal cars equipped with automatic dumping devices began early in 1964 when a prototype car was built at Havelock. The door mechanism was operated by both air and electric motors. The car, capable of carrying 105 tons of coal, was tested under various operating and weather conditions. During the first tests, 105 tons of coal were dumped in less than 20 seconds at Aurora, Ill.

Information gained from these tests resulted in certain mechanical modifications which were incorporated in a second aluminum prototype, built in September 1964. This time door motors were actuated only by compressed air. With this car, approximately 100 tons of coal could be dumped in 17 seconds. After extensive testing, including exposure to minus 50 degree F weather for 50 hours, the air-operated doors were rated as definitely superior. The second car's performance was such that it became the basis for the 139 cars subsequently built.

● **Weight important.** Aluminum alloys were chosen for the bodies of the prototype and production cars. A car with Alloy 5083 sheets and welded braces was found to weigh about 54,000 pounds, some 5 tons less than a steel car of comparable size.

The five additional tons proved to be an important economic consideration. Fully loaded, the aluminum car would

First railroad mass production of aluminum cars

weigh about 263,000 pounds, just within maximum load limits for the route between the mine and the Sioux plant. Another requirement was that the car be within clearance outlines shown in the latest revision of AAR Plate B.

• **Steel underframes.** The underframes of all the unit-train cars have been fabricated of steel; the carbodies of aluminum. A conventional steel center sill extends through the middle of the car between bolsters. At each end it is welded to a Scullin cast-steel draft arm. The bolsters are steel, as are the angles which form the crosmembers of the underframe.

Four manufacturers—Alcoa, Dow, Kaiser and Reynolds—furnished the aluminum. The aluminum sides, ends and transverse braces (all all-welded fabrications) were assembled complete by FMC Corp. at its South Charleston, W. Va., plant. The sides are girder design and include the side plates, side sheets, side sills and intermediate side posts.

The end assembly includes the top end angle, 5/16-in. slope sheet supports and side angles. There are three tubular transverse braces terminating at each end in a flat plate which is welded to the car sides near the top.

Two high-strength aluminum alloys are used. The 0.312-inch side sheets and extrusions used for side framing are Alloy 5083, containing 0.80% manganese and 4.45% magnesium. Corner posts and other heavier extrusions are Alloy 6061, a readily welded material containing magnesium, copper, silicon and chromium.

• **A railroad 'first.'** Burlington officers say that Havelock shop is the first railroad-owned facility to mass produce aluminum cars. While major subassemblies were purchased from FMC, the road's shop did fabricate many of the other aluminum parts from sheets and extrusions. The entire assembly procedure was planned and executed by Havelock shop forces. After the production line was operating smoothly, cars rolled off it at the rate of five per day.

Assembly techniques have been changing at Havelock. Hot-driven rivets with the associated heaters and manpower and the smoke and haze have virtually disappeared. Welding and cold riveting have been adopted as the standard fastening methods. In construction of the aluminum-and-steel hopper cars, welding methods had to be revised. The changeover to permit the proper welding of aluminum was made in a comparatively short time, aided by welding classes and instruction by the supplier's supervisors. The Linde Sigmatic line of semi-automatic wire feed equipment was used. There were 19 welding machines used for aluminum assembly and six for steel welding on the cars.

Only one of the three assembly tracks in Havelock shop was used for the construction of the aluminum cars. After the steel underframe had been assembled in another area and moved to its trucks at the head of the line, the car moved through ten assembly stations. From the time the aluminum transverse and longitudinal hoods were applied to the underframe at Station 1 until the car emerged from Station 10 ready for testing of brakes and air-operated doors, approximately 1½ hours had elapsed.

• **Manpower requirements.** Production line work on Track 2 and fabrication of parts for the aluminum cars was handled by 150 employees on one shift, five days per week. On a second shift, 15 employees performed miscellaneous work such as building doors, assembling hood sheets and completing welding.

All steel-to-steel and aluminum-to-aluminum components were welded. Parts which could not be welded because steel-to-aluminum connections were involved, were joined either by Huck high-tensile bolts, or by conventional high-strength bolts secured with Elastic Stop Nuts. Corrosion of the steel-to-aluminum joints was inhibited by a coat of Polybutene applied during the assembly.

• **Door operation.** The door-operating mechanism, designed by Enterprise Railway Equipment, is powered by two 3¾-hp Chicago Pneumatic air motors connected to four gear boxes and crank assemblies which produce the quick dump and quick closing cycles. For powered operation, all sixteen discharge doors are opened or closed simultaneously by one man operating a single valve. If power is not available, the eight doors at each end of the car may be operated manually. To prevent unauthorized movement of the control air valve, a key-operated lock secures the handle.

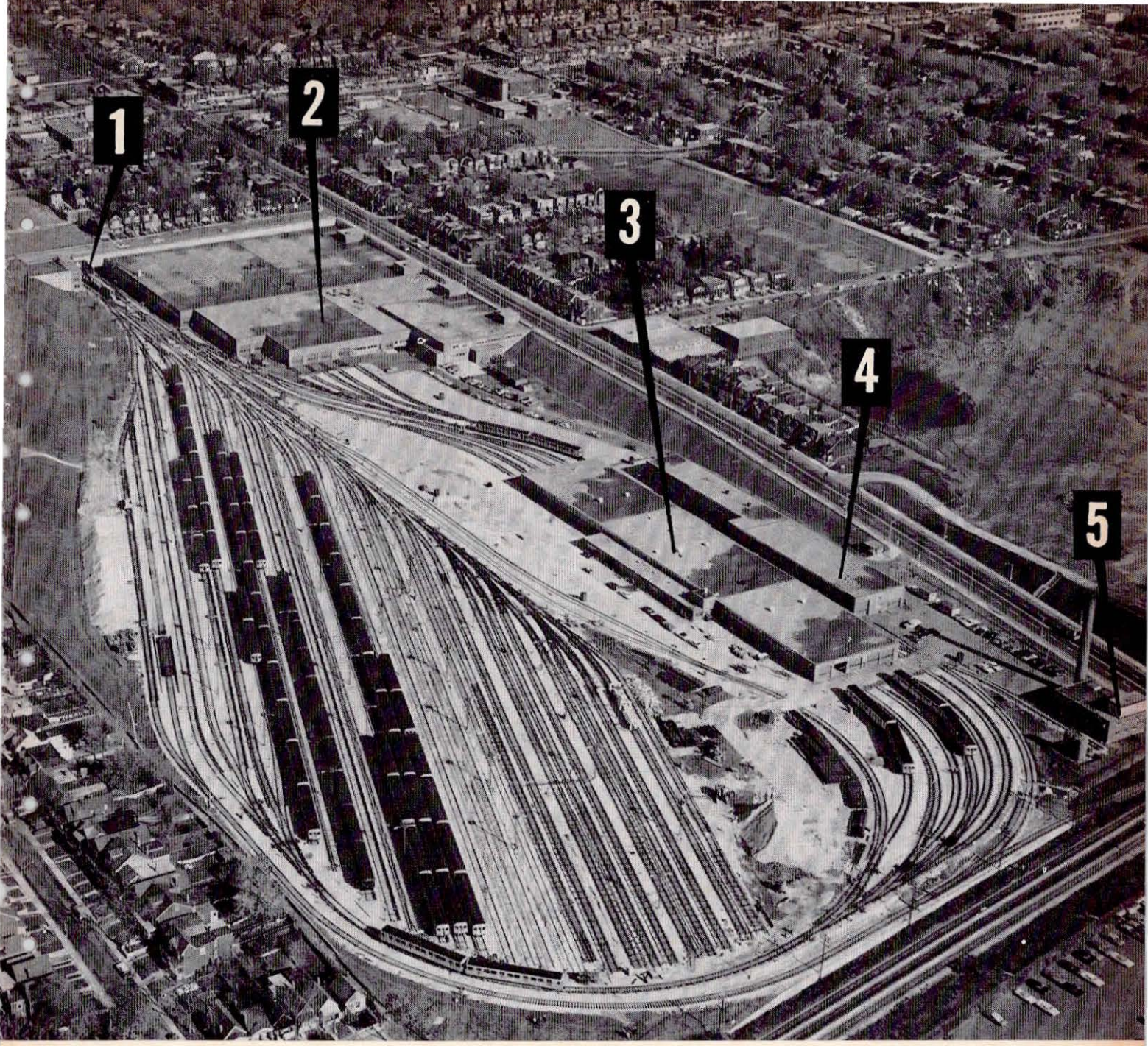
At 90 psi air pressure, the powered operation is simple and fast. The mechanism allows a free drop of the doors, a process complete in four seconds. The doors are then closed and positively locked in approximately six seconds by an over-center locking feature together with a self-locking gear reduction assembly.

The car has a length over coupler pulling faces of 53 feet 2½ inches; a length inside the body of 46 feet ¼ inch. Width over side stakes is 10 feet 7⅜ inches; width inside the body is 9 feet 9½ inches. Height from rail over the top of the sides is 13 feet.

With a 370-cubic-foot heap, the car's capacity is rated at 4,116 cubic feet. Door opening area is 165.2 square feet. Slope sheet angle is 50 degrees. ■

Burlington Cars — Partial List of Specialties

Aluminum	Aluminum Co. of America Dow Metal Products Kaiser Aluminum & Chemical Reynolds Metals
Trucks	Standard Car Truck
Truck springs	American Steel Foundries
Side bearings	A. Stucki
Wheels	Edgewater Steel
Roller bearings	Timken Roller Bearing
Roller-bearing adapters	National Castings
Roller-bearing retainers	Buckeye Steel Castings
Brake-beam wear plates	Unit Truck
Brake-pipe clamps	Central Railway Supply
Brake steps	United States Gypsum
Hand brakes	Ajax-Consolidated
Couplers	Symington-Wayne
Coupler wear plates	Conley Frog & Switch
Coupler yokes	Omaha Steel Works
Coupler release rigging	Standard Railway Equipment
Draft gear	United Centrifugal Pump
Draft-arm castings	Scullin Steel
Draft-key retainer	Illinois Railway Equipment
Door mechanism	Enterprise Railway Equipment
Door motors	Chicago Pneumatic Tool
Door control lock	Adams & Westlake



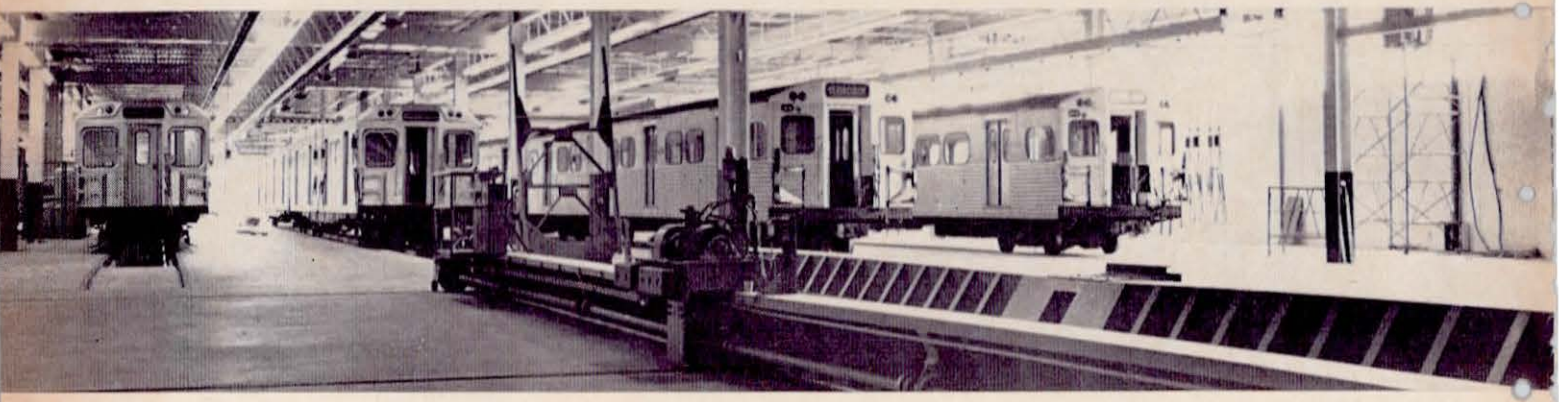
Toronto's new transit shops step up tempo

- **Heavy maintenance work is fast approaching full operation.**
- **The facility is part of a subway project opening in '66.**

The Toronto Transit Commission's 31-acre Greenwood Yard incorporates five major structures. Indicated in the photo are (**1**) the portal building where trains are received and dispatched; (**2**) the overhaul and repair shop for major work on bodies, running gear and propulsion equipment; (**3**) the car shop for minor repair work, inspections, running repairs and car washing and cleaning; (**4**) the way and structures building for production of track work and rail equipment maintenance; and (**5**) the steam plant that supplies heating for the entire facility. The yard provides nine miles of trackage with space for the storage of 250 cars. (*A detailed description of the facility appears on the following two pages.*)

OVERHAUL SHOP

Repairs of varying complexity are possible in new overhaul shop. Wheels can be contoured in place on truing machine (left). Carbody repairs and painting are handled in special areas (right). Transfer table in single-end shop is arranged so area beneath it can be traversed by shop trucks (below).



Virtual doubling of Toronto's transit car fleet created the need for expanded shop and car storage facilities.

The new Greenwood car shop and yard, called by the Toronto Transit Commission one of the best arranged and best equipped of such facilities in North America, is gradually approaching full operation. For several months TTC has been stepping up the tempo at Greenwood, although the 8-mile Bloor-Danforth subway along which it is located is not scheduled for opening until February 1966.

While finishing touches are still being put on Greenwood shop and yard, TTC has been doing some car work at the site since May. It was to this shop that practically all of the 164 new aluminum carbodies (RA, June 14, p. 21) built by Hawker Siddeley Canada at Fort William, Ont., were delivered for installation of the trucks which had been assembled at Hamilton, Ont.

• **Heavy maintenance.** The planning for the heavy maintenance facility has been part of the Bloor-Danforth project from its inception in 1958. The maintenance facility at Davisville station on the original Yonge Street subway had, from the beginning, been planned primarily as a trip inspection point. During the first decade, however, Davisville had to perform all of the maintenance on the equipment put into service with the opening of the Yonge Street Line. Wheel work and some other heavy operations had to be performed at Hillcrest street-car shop, with parts trucked between that point and Davisville.

The site chosen for TTC's full-scale transit car shop is toward the east end of the Bloor-Danforth line. The site itself was a former quarry which had subsequently been used for a dump. TTC, by compacting and backfilling the areas covered with refuse, was able to make effective and economical use of a problem site, at the same time gaining the enthusiastic acceptance of adjacent property owners.

• **Air-rights potential.** As elsewhere on the TTC subway system, consideration was given to the potential development of air rights over Greenwood yard and shop. Steps were taken to permit such development of the site if it ever becomes economically feasible. Tracks were located so that column construction would be possible between them. Foundations and columns of shop buildings have sufficient strength to permit adding additional floors in the future.

The virtual doubling of the TTC car fleet in conjunction with the Bloor-Danforth line expansion has made necessary an expansion of car-storage areas. With almost nine miles of track on the Greenwood site, there will be space for storing 250 cars. There will be two types of train movements in Greenwood Yard—service trains proceeding to and from the main line, and local train movements within the yard limits.

Signals and switches for main-line trains are controlled remotely from TTC's central control machine located at St. George Station, present terminus of the University route. Single-rail, resistance-fed track circuits in this area produce approach locking of all switches. Associated with each signal will be the standard automatic train-stop mechanism.

• **Yard movements.** Local movements within the yard are controlled by a General Railway Signal NX-type local control machine in the car-shop building. The NX control, according to TTC, permits speedy routing of trains through yard interlockings. Switch machines within the yard limits are specifically designed for the application, permitting trailing movements with proper signal protection. On columns throughout the yard are 48 two-way speakers to allow the control machine operator to communicate with hostlers on trains in the yard.

The largest building at Greenwood is the overhaul and repair shop. It consists of 192,000 square feet on ground level and 28,000 square feet on a mezzanine level. Because of the site's location, which required a dead-end arrangement of the tracks within the overhaul and repair shop, there is a transfer table at its north end. The 82-foot table is capable of handling the 75-foot cars which are now standard on the TTC, along with the Trackmobile which is used for most car

switching within the shop. The transfer table is designed so that the area which normally would be an unusable pit is accessible for movements of materials-handling equipment in the shop.

Among the operations and areas for which space is provided in the overhaul and repair shop are: Wheel turning; mechanical turning; Mechanical and electrical overhaul; car hoist area for truck changes; paint preparation and spraying; truck repairs; major body overhaul; bench repair and cleaning; machine shop; electrical repairs; welding; woodworking and stores.

As with most rapid-transit operators, wheel wear is a major problem for TTC. Two Hegenscheidt wheel-truing machines, installed in pits on two tracks in the shop, are used for inplace restoration of car-wheel treads and flanges. The under-floor machines are centerless devices so that they can be operated without the need for removing current-collection apparatus and axle caps from the car trucks. Duplicate machines are installed to insure adequate capacity.

● **Wheel replacements.** When wheel replacements are necessary, or when other work must be done on car trucks, there are two-car hydraulic hoists installed along a nearby track for raising, simultaneously, two of the semi-permently coupled cars. Carbodies can be elevated a maximum of 5 feet. When in this raised position, holding posts can be engaged while any, or all, of the trucks are removed.

Small turntables placed in the track along which the hoists are installed make it possible to rotate and roll trucks into their adjacent overhaul area. Nearby are an axle lathe, wheel borer and wheel press for production of new wheel sets.

● **Carbody repair.** Cars being moved into the major overhaul and painting areas of the shop must traverse the transfer table. The 82-foot transfer table is capable of simultaneously accommodating one of the 75-foot cars and the Trackmobile.

Cars being worked on the four heavy overhaul tracks in the northeast corner of the shop are raised with portable jacks and supported on holding posts while undergoing repairs. Adjacent to these tracks are welding, woodworking, upholstering, electrical, and air-brake work areas, and the machine shop.

The twin painting bays are interconnected so that a single paint-spray booth may be used in either one by moving across transverse rails from one to the other. This enables one car to be masked and generally prepared for painting, while actual painting is proceeding on another car in the adjacent bay.

● **Car shop.** Along with the facility for heavy overhaul work, Greenwood also has a 58,000-square-foot car shop where cars can be cleaned and inspected between assignments. Toronto's winters have necessitated installing the car-washing equipment in a separate section of this building. With the indoor arrangement it is hoped that continued exterior washing will be possible through the coldest winter, a practice previously not possible because cars would ice up in the process.

The rotating brushes of the machine are held against the sides of the cars by a constant-force air-pressure system. Sufficient track extends beyond the washing machine to allow cars to drain before they emerge into the open. Drying is further expedited by a high-velocity air-jet system, supplied with warmed air, which is installed in an arch over the track. Car interiors are also cleaned and washed in this area.

The car shop's inspection bay is used not only for running inspection, but also for minor repairs. The three-level arrangement, like that used in many railroad shops, is seen by TTC equipment people as a significant advance in transit-car servicing.

The way-and-structures building is initially being equipped with a forge, welding equipment, and various machine tools for track fabrication and roadway equipment maintenance. It is expected that the TTC rail bender, presently at Hillcrest shop, will eventually be installed at Greenwood. ■

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Three-level area (left) is facilitating trip inspections and servicing of cars between assignments; cleaning is done indoors so that it may be a year-around operation (right). Brushes and drying arch are on the unoccupied track.

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HAROLD A. LENSKE DISCUSSES C&NW'S

Approach to the mass transport problem

Harold A. Lenske is a big, good-natured fellow who describes himself as a "worrier by nature." For two and a half years, he's held a job that—on many properties—would make a professional worrier out of the rankest amateur. But Hal Lenske has survived in good humor—people know he's a worrier only because he tells them so.

Lenske, a former public-relations officer, is director of commuter and passenger services for Chicago & North Western. At one point, not so long ago, North Western had perhaps the worst commuter service in the industry. Now it can lay claim to having the best.

Chairman Ben W. Heineman and President C. J. Fitzpatrick took one look at North Western's commuter operation and shuddered, when they took over the road a decade ago. They dieselized. And then they set out to completely re-equip the car fleet. Orders were placed for double-deck coaches. And North Western (along with Pullman-Standard) started looking at the possibilities of a push-pull operation, in which there would be no need to turn the train at downtown or suburban destination. Push-pull worked fine—and has been adopted since by three other roads.

From the beginning, Lenske was involved. North Western knew well that public relations had to play a big part in putting across suburban-service improvements and the other changes that had to be made—fare adjustments, the closing of close-in stations, use of flash-type tickets. And so Lenske, along with F. V. Koval, C&NW's p.r. director, were hip-deep in the whole commuter revolution.

And revolution it's been. North Western's volume keeps going up (78,000 riders a day now) while other roads' totals sag. Most Chicago roads show improved financial standings—but C&NW leads the way, and will probably net $1 million before return on investment this year. This has come with no fare increase since 1962.

Here, Lenske talks with Railway Age Senior Editor Gus Welty—about what North Western has done, how it's done it and what it hopes can be accomplished in the future.

Q. North Western has made something of a science of the commuting business. Just how have you gone about this?

A. In recent years, we've attempted to find out what we can about the commuter—what he is, who he is, what motivates him, and so on. We know quite a bit about our riders, through surveys of our own and surveys made for us by outside concerns.

Our average commuter now rides about 21 miles. For the most part, he comes to the downtown area of the city. This is not to say that we don't have a little intermediate rider volume—but for the most part our service is from suburb to downtown city. As such, we serve as a corridor very much as an expressway serves as a corridor of movement. And the movement in this corridor—with our new equipment—is now what could be described as a greased chute. It's reasonably fast, very reliable and dependable and reasonably low-cost compared with the alternative way of getting downtown, which is the private automobile.

Now, the movement of a rider by mass carriage of any form is always three trips in one—in that you must get to and from the form of mass movement. You either walk to it or you drive to it or you are driven to it. Then you go through this corridor of movement, and to get to your destination you either walk or are driven by cab or bus. What we are attempting to do is develop the first and third trips as much as we can, because we think we now have—at least up to this point—perfected the middle movement of the rider to the extent we are now able. It's possible that in years to come we will have faster trains and more frequent trains. But the middle movement is now relatively fast, relatively comfortable, extremely dependable.

Q. What have you been able to do to improve the first part of the trip, out in the suburbs?

A. In the suburbs, the density of population is such that it is extremely difficult—and perhaps impossible—to provide mass movement to the suburban station by bus. We have tried wherever we can to create parking, to expand it when parking demands seem to indicate we need more parking, and to make sure that we have a smooth operation not only for the parker but also for the person who is driven to the station. At some stations where we were short of

land we have actually acquired property to expand suburban parking. There is, of course, a direct relationship between parking availability and rider volume, because at least half of our riders drive or are driven to the station and about 25%, in fact, do park.

Q. Nobody's had much success hooking your service to suburban bus service?

A. No, not much. One of the reasons for this is that the movement of riders to the suburban station within a community is not along a straight line. Riders don't all originate down Main Street—they come from all directions. So a bus operation within these low-density towns is difficult. Moreover, these bus lines have their own problems, their own scheduling difficulties and so on, and the market for commuters coming from home to suburban stations and returning at night is just not that great along fixed bus routes. We have had a little success in some towns, but it is modest. There has always been some connecting bus service in the suburbs that we serve, and we still have that, but it doesn't amount to much.

Q. Then you have the problem of the third trip, in the central city . . .

A. At the downtown end, distribution of our riders and collection of our riders is really the key, we think, to growth—for the reason that any improvement that is made in the central city will benefit riders from all stations. Now, about 85% of riders walk from the downtown station to their work locations. The remaining 15%, for the most part, use a Chicago Transit Authority bus or cab—usually to a destination beyond walking distance. As anyone knows, here in Chicago during the peak of the rush hour, with central-city street congestion, the movement by bus or by cab is not fast. It's erratic, it's unreliable insofar as scheduling is concerned. A trip of, say, 10 blocks on a crowded downtown street might take eight minutes one morning and 15 minutes the next morning, depending not only on weather but also on the street congestion—which changes from morning to morning, regardless of weather.

Now, as ways are found to improve the dependability, the frequency, of downtown movement during all kinds of weather from and to our downtown station, I think—to that extent—our service will become useful to greater numbers of people. As I say, we concentrate here because improvements made here will benefit riders from all stations.

Q. What have you been able to do, in improvements to service downtown?

A. For the first time in many years, North Western—with the fine cooperation of CTA—did in fact improve the collection and distribution of riders in 1964, with a new and improved shuttle service to and from the downtown station—for 15 cents. The service had been in effect for a number of years, but our riders were forced to board on the wrong side of the street at the downtown station. We were sharing buses at our station with the Union Station people, and the buses were often crowded when they hit North Western Station.

Under the new arrangement, we have our own buses which pull up directly to the station doors. They are empty on arrival, so that our people get seats. In addition, CTA was able to slightly expand the coverage of these 15-cent routes. CTA's rider volume has almost doubled on these 15-cent buses since this change was made. It varies, of course, day to day and seasonally—and when it rains they may handle 50% more than normally—but their daily rider volume has virtually doubled on these 15-cent routes with this very modest improvement in service.

Q. What's needed, beyond this?

A. What is needed, we think, in the downtown area of this city is a dependable, completely grade-separated collection and distribution system. We are hopeful that this can be accomplished as Chicago works out its plans for new subway improvements in the downtown area. Hopefully, this would provide connections —subway, rapid-transit connections—with the major railroad stations in the downtown area.

The city applied for and got a loan of $1 million for an engineering study. There will be special problems because of the position of our station and of Union Station west of the loop area and just west of the Chicago River. If a subway is in fact contemplated, there's a question as to how deep the subway will have to be as it contacts our station—because we are just a half a block west of the river. This offers major engineering problems—and yet the solution to distribution and collection of rail-transit riders from all stations lies in connections with dependable, reliable, all-weather transportation by rail to the far corners of the downtown area.

Q. Will North Western and other commuter lines have a say in these plans?

A. We are hopeful that we'll play an important part in this, because city planners, we think, are in agreement that (1) Chicago now has the finest suburban train service network in the nation, and (2) it is vastly under-utilized, even during rush hours, and ways must be found to utilize what we now have. I think that city planners, and the CTA as well, realize that the city must move in this direction to fully utilize these high-capacity radial lines which converge from all directions onto the central city. Chicago now has about 470 miles of suburban rail lines converging on the central city. In addition, it has about 75 miles of CTA rapid-transit lines. So Chicago has more than 540 miles of so-called mass-transit rail lines. By comparison, the $1-billion San

Francisco-Oakland project contemplates a 75-mile rail line—new and modern to be sure, coordinated with feeders, and unquestionably it will be a model for cities all over the nation. But Chicago already has more than 500 miles of such rail lines, and better ways can be found to use them.

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we will be faced with a year from now. Our growth is continuing so far in October and November, but at this point I don't know whether or not we will need additional coaches next year. We got 10 in 1963 and 10 in 1965, which gives us 220 double-deckers now.

Q. What does your advertising program consist of now?

A. We're continuing to spend upwards of 1% of our gross dollars on promoting the service each year, as we have done now for six consecutive years. During the past three years, our program has been primarily in radio spot announcements during the a.m. and p.m. drive-time periods, rush-hour periods. We sponsor a number of the so-called traffic shows here in Chicago. We are not sure how many motoring commuters we are converting, but we are sure that our advertising program—that the day-in and day-out promotion of this service—is an important ingredient in the success we have had. We believe this for several reasons. First of all, you can't argue with success, and we have been modestly successful in attracting new riders. We have discovered a few important things. Our ticket-by-mail plan, which now covers about 10,000 riders, has given us a new insight into the nature of the commuter. There is a constant changeover of riders each year, in far greater numbers than we thought.

Q. In other words, if you are up 5% there might actually be a 20% shift?

A. Yes. This is the result of the mobility of people—people who move within the area to another location, people who move from outside the area into one of the Chicago suburbs, people who change jobs, people who die or retire. There is constant mobility. Now, when the market for a service changes to a great extent year after year, we think that the day-in, day-out promotion of that service is vital—because with so large a portion of the market changing, there is a completely new group month after month. We think promotion is important.

Q. You have also been doing tie-in work with real-estate people in advertising?

A. Yes, this program started this year as an adjunct to our regular day-in, day-out promotion on radio. We would like to become involved more closely with the realtors in each of our suburbs. There are some 250, 275 realtors in our suburbs. As people move into our area, as brand-new potential commuters, we want them to know about our service just as soon as possible so that they don't start driving. We think the modest program that we undertook this year with ads in the classified real-estate sections of the Chicago newspapers brings us that much closer to the prospective home buyer. And while we haven't been able to gauge the results of this, because we conducted it in a limited way in 1965, we plan to expand this program in 1966. Our attempt here is to point out to home buyers that the trip between home and work is an important consideration in the selection of a home site, in the selection of a suburb—and, of course, we hope to influence them to move to a North Western suburb.

Q. How is all this paying off for C&NW this year?

A. Our business for nine months is up 5% on riders and revenues—we haven't increased fares since 1962. Our commutation revenue is up for nine months about 3%. We're seeing growth in both rush hours and off-peak, and we are very encouraged by this off-peak growth. It has been continuing for several years since we installed hourly off-peak service on all three divisions.

Q. Have there been gains on all three suburban lines?

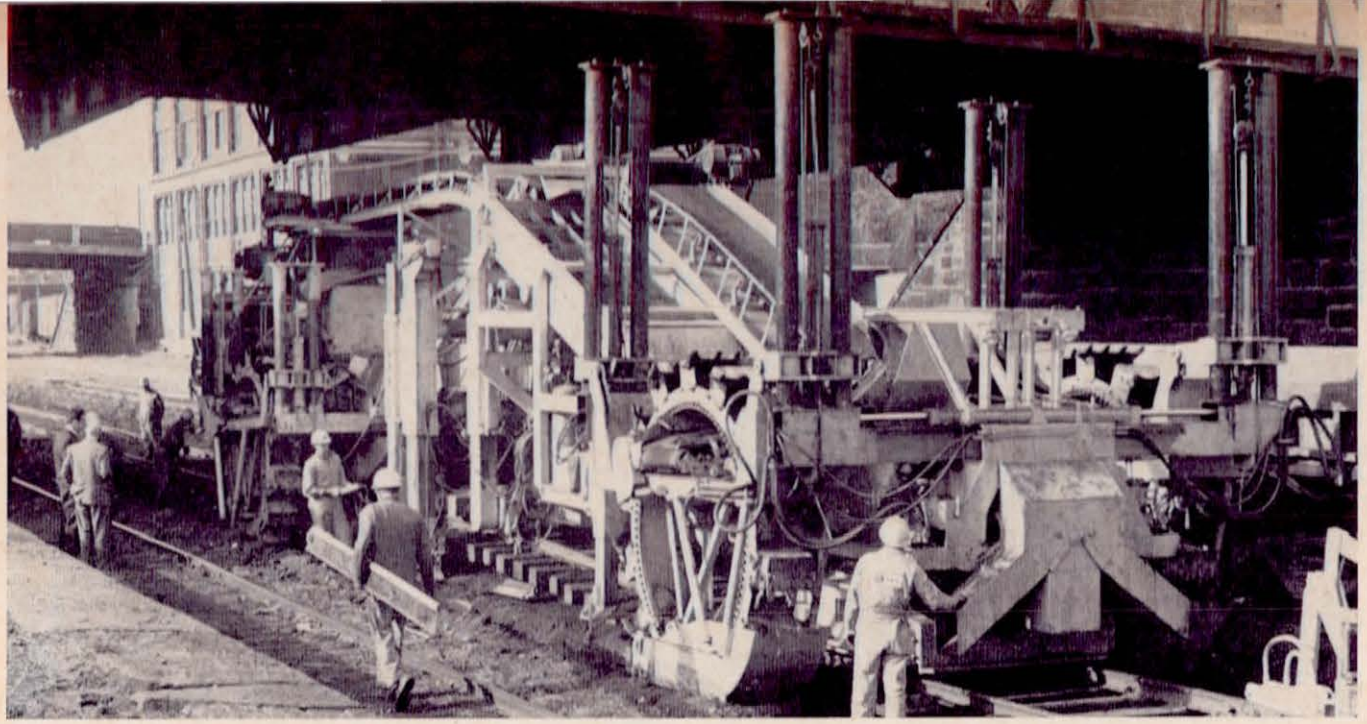
A. Yes, modest on the Milwaukee and Galena Divisions, and sizeable on our Wisconsin Division, the northwest line. This is related more than anything else, we think, to the rate of population growth on our northwest line. The Wisconsin-Division towns are growing at almost three times the rate of the communities on the other two divisions. During the past five years there has been a population growth of about 30% on the Wisconsin Division, while on the Milwaukee and Galena divisions the growth has been only about 10%.

Q. These increases are carrying through to net?

A. Our net income in 1964 was $706,000. That will be considerably improved in 1965—in all likelihood it will be in the neighborhood of $1 million. That is after interest on the equipment, but, of course, before a return on the investment.

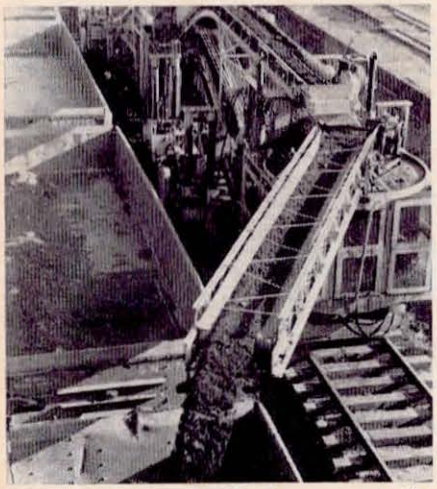
Q. You see these gains continuing?

A. We're still hopeful. We are hopeful for the reason that our suburbs are still growing—and the central city is still growing constantly. As central-city growth moves westward toward the river and across the river—as is now occurring—we think we still grow in our usefulness to the community. We see at this point no indication of a slackening-off of this growth. We are predicting modest growth again next year—so we are optimistic. ■



NEW MODEL of Mannix Undercutter-Cleaner retains the basic features of the prototype machine. They have been relocated on an improved frame for providing greater rigidity.

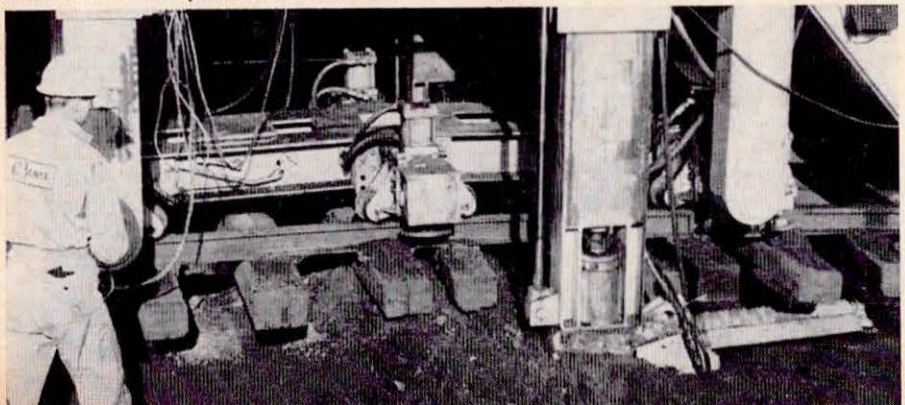
New track machine needs less manpower



DISPOSAL CONVEYOR is now at the front of the unit where spillage will not fall on cleaned ballast and to permit a work train to work on undisturbed track.

The Mannix Undercutter-Cleaner has been redesigned for greater output and more reliability. The production rate while undercutting and cleaning ballast has been increased about 20%. On the GN the machine has averaged 2½ minutes per rail length.

MATERIAL under the track is undercut by cutting edges and cast to the sides in windrows. This operator controls the track-supporting and aligning assembly.



On Oct. 20, Mannix International, Inc., unveiled its new and speedier Undercutter-Cleaner model. The place was on Great Northern's No. 5 freight main near downtown Minneapolis, Minn. The machine is designed to undercut the track, pick up and clean the ballast, return it to the track, cast out the waste material, eject the ties to be renewed, and to align the track—all under its own power.

The original model of the machine was introduced in 1964. It worked first on the Baltimore & Ohio, then on the Pennsylvania and the New York Central. Mannix reports there was a progressive increase in production as the machine moved from road to road. Field experience, however, indicated it needed more speed and greater reliability of performance. The decision to redesign the machine was made at the end of the working season.

- **Basic features retained.** Confident that the over-all concept was sound, Mannix retained the basic features of the prototype machine in the latest model. These include two pairs of large-diameter digging wheels, the track-support and cutting-edge assemblies and the tie-ejecting mechanism.

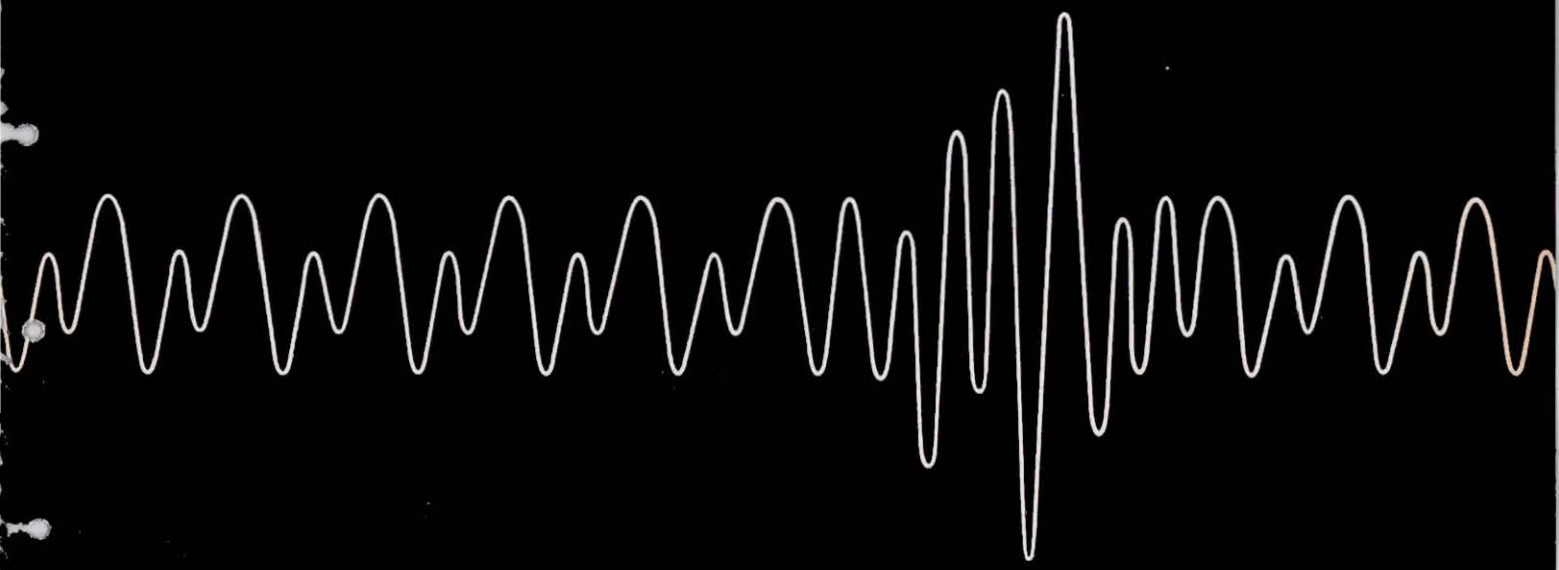
As before, one pair of digging wheels is behind the front truck and the other at the rear truck. The forward digging wheels, which can excavate as much as 44 in. below the bottom of ties, pick up the shoulder ballast and drop it onto a belt-conveyor system that carries it to a vibratory screen. The cleaned stone is deposited at the rear of the machine, either on the shoulders, between the rails or to both areas.

- **Working parts shifted.** In redesign-

(*Continued on page 42*)

Circle 15 on reader service card ▶

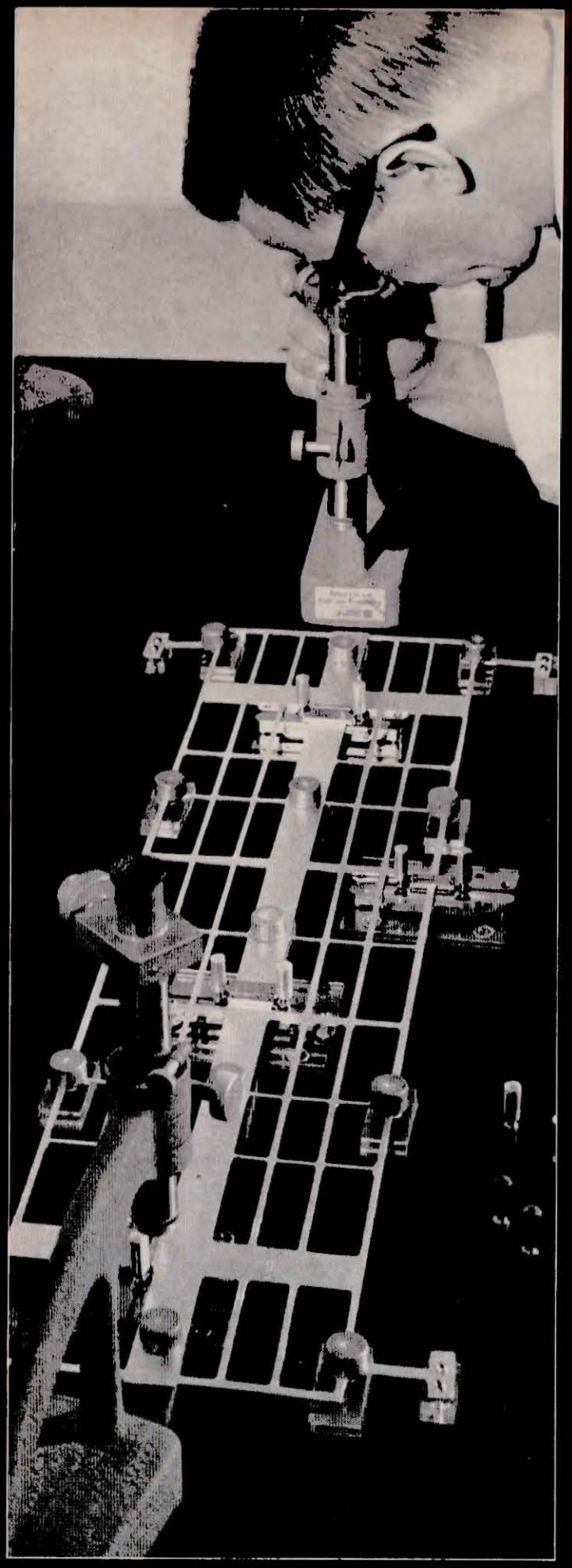
Moment of Truth in Boxcar Design



As ACF Precision Design™ boxcars undergo jarring impact tests, a battery of electronic devices records "the truth" of their ability to handle shocks and heavy loads in service.

The truth adds up to this. ACF Precision Design is a major new concept. It enables ACF to build you a boxcar with strength where you need it. Your car is never overdesigned or underdesigned. You get longer service life, lower maintenance, and up to 3 tons saving in deadweight.

How is it done? Read on the next two pages how ACF's Technical Center developed matched, pretested components, each precisely right for its structural function. Today the truth is out. Over 8000 ACF Precision Design boxcars are already serving 25 railroads all around the country.



ACF electronic testing, precision design assure components just right for your boxcar

ACF employs a basic boxcar design involving eight key structural components.

These components are standard. The collective attention of many ACF departments has been focused on perfecting them. Each component has been lab and field tested, improved, retested. Each is structurally compatible with the other. The specific requirements of **your** boxcar dictate the quantity, length and material grade of components to be used.

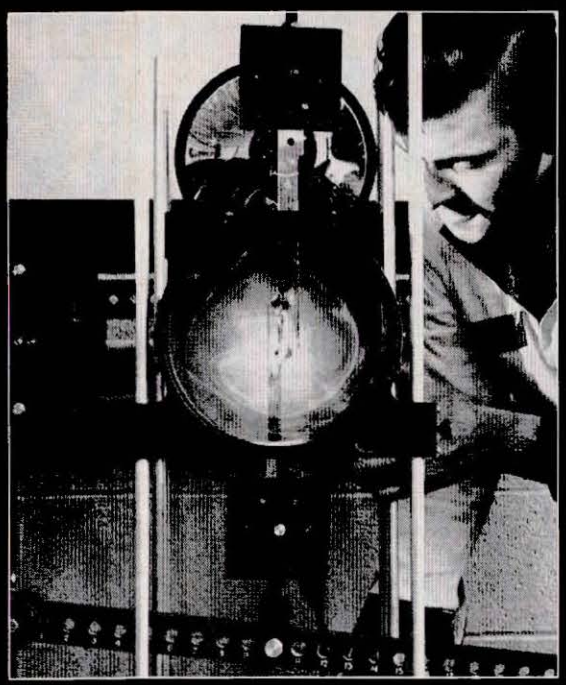
Thus you know in advance that you'll get the **right** boxcar for the job. The strength is where you need it. Through precision design and use of high grade steels, you save from 2000 to 6000 lbs. in deadweight.

You may choose 50-ft. or 60-ft. boxcars, fork lift truck loads from 12,000 to 60,000 lbs., interior equipment, load restraining devices. There are door sizes and locations to fit your needs exactly.

ACF evaluates metallurgy for strength and fatigue resistance. These mounted specimens are from bar, plate and sheet stock, and butt and lap-welded joints. They're polished to a mirror finish for metallographic examination.

The test is simple for Precision Design components: will the material grade used perform better than any other economically available?

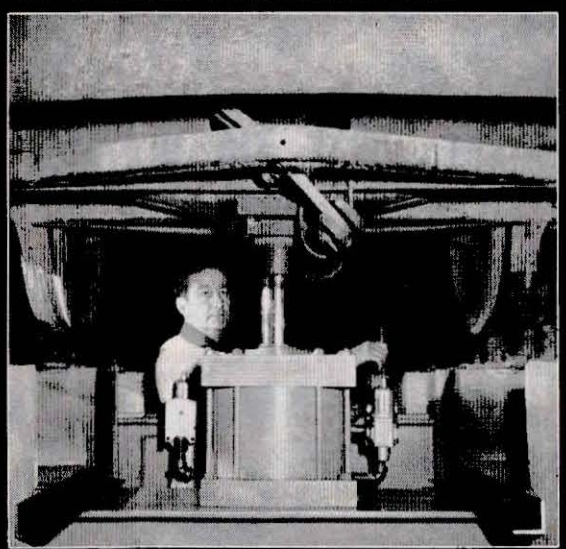
Underframe design is checked for load-stress forces. ACF technicians use transparent plastic models to pinpoint location and magnitude of stress in welded connections and areas of stress concentration. Result: optimum design with strength concentrated at critical points.



Materials are examined by polarized light. Even the most scrupulous surface examination is not enough for ACF Technical Center researchers. Here, a polariscope is being used to investigate stresses in lap-welded joints.

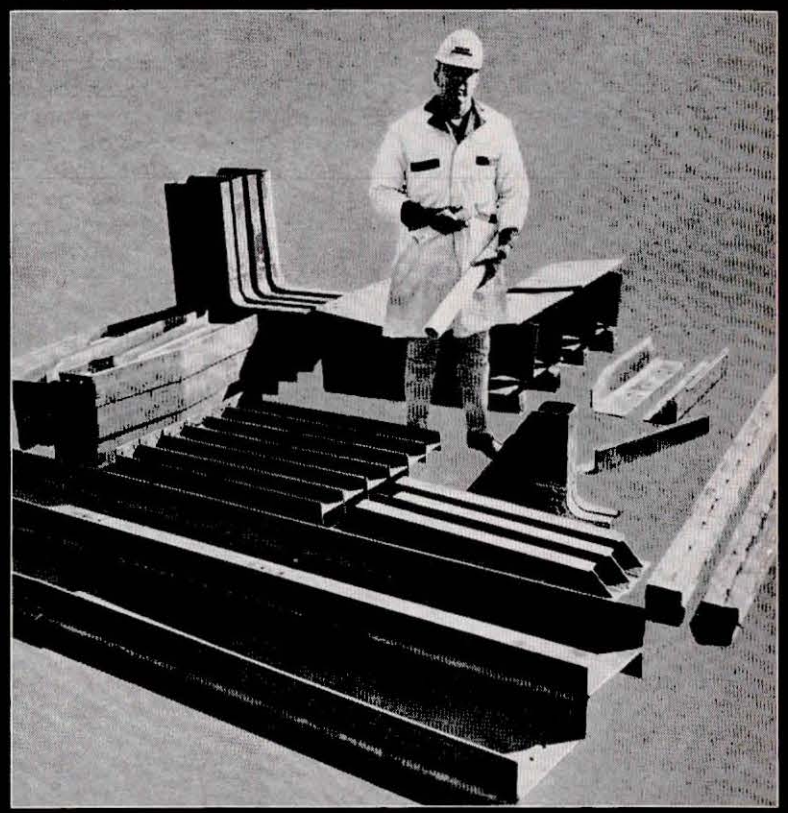
Cars are "tortured" on this exclusive ACF device. This 125-ft. ACF-designed testing device — the only one of its kind in the industry — accommodates a fully loaded boxcar.

It applies longitudinal, lateral and vertical loads, puts on a 1,250,000-pound squeeze, a 1,000,000-pound pull, tilts to simulate curves, and oscillates cars in fatigue tests that duplicate years of rugged service in weeks.



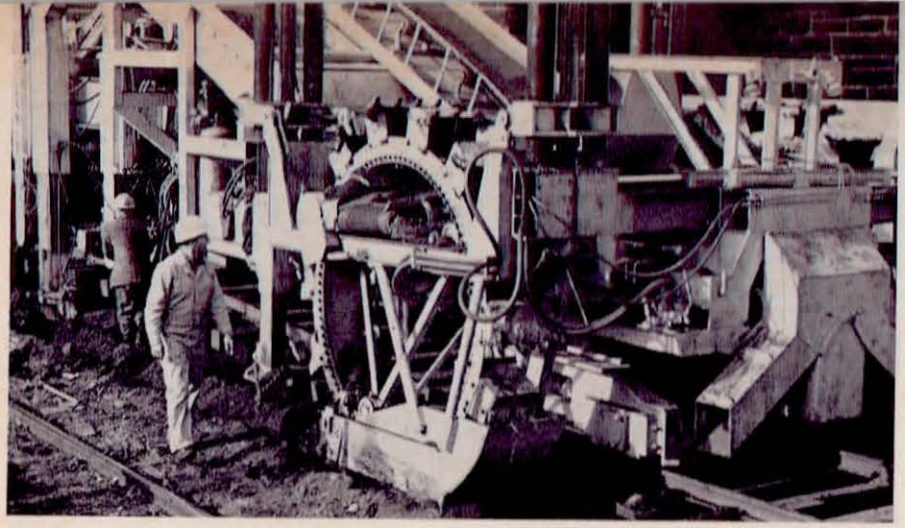
Components were tested in actual boxcar assemblies. Lab and engineering tests were backed by testing on the rails in completed boxcars.

Thoroughly pretested Precision Design Boxcar components are ready to go — into boxcars that give you unmatched performance, strength, light weight, higher payloads, complete flexibility.



The ACF Precision Design concept can contribute to your profits. Have your ACF representative give you the full story. Call or write American Car & Foundry Division, ACF Industries, Incorporated, St. Charles, Missouri 63301, or our sales offices in Chicago, Philadelphia, St. Louis, San Francisco, Washington, D.C.

acf ACF INDUSTRIES



REAR PAIR of digging wheels picks up the windrowed material and, by a system of conveyors, the material is carried to screens. The cleaned stone is deposited on the track at the rear and the fines are wasted.

(*Continued from page 38*)
ing the machine the main working parts were shifted to a more central position on the frame. The purpose was to distribute the load more evenly between the front and rear trucks and to decrease the arc of the track structure required for inserting and removing under-track components. The track-undercutting assembly in particular has been centered on the frame. This assembly includes two cutter edges, each about 3 ft wide and 6 ft long. When in the working position the edges are arranged end to end under the track. Material excavated by the cutting edges is cast outward on each side of the track by two endless chains equipped with paddles.

Baffle plates on each side stop the cast material, causing it to pile up in a windrow on each ballast shoulder where it is picked up by the rear digging wheels. This material is likewise dropped onto a conveyor system that carries it to a second vibratory screen for cleaning. It is deposited on the track at the rear of the machine.

As before, the tie-ejecting mechanism, located directly behind the cutting edges, includes two hydraulic hammers which knock ties to be renewed from the rails, and knurled rollers that eject the ties to either side of the track as desired. This is operated from a remote-control pushbutton station by a track foreman walking alongside the machine. A Mannix crewman controls a mechanism that rough lines the track as the machine moves along.

• **Now it's much heavier.** The new model weighs approximately 100 tons, compared with the 80 tons of the pilot machine. The increase in weight is due primarily to a strengthening of the entire unit. The former lattice-type frame was replaced with a frame in which the main member consists of an all-welded wide-flange beam extending from the front to the rear trucks. A Mannix spokesman explains that the greater rigidity of the frame enables the track-working components to perform as intended, thereby producing a smoother roadbed and over-all operation. In addition, it gives ready access to all parts for easy maintenance.

Other improvements include the housing of all engines, pumps and electrical components in one cab. The cab roof protects them from inclement weather and they can be serviced better.

A more efficient four-wheel drive and hydrostatic transmission have been incorporated in each truck. These can propel the unit at speeds up to 10 mph.

The waste-disposal conveyor was moved from the rear to the front of the machine so that no spillage will fall on the cleaned ballast, and also where it can serve dump cars of a work train supported on undisturbed track. The waste hopper is now vibrated to assure self cleaning.

• **Fewer men needed.** Instead of the five men required to operate the pilot machine, only three are required with the new model. This was made possible by a redistribution of the controls. One man now controls the forward half of the machine, and other the rear half. The third man controls the track-elevating and lining assembly. Each control station has a master switch for stopping all belt movements so that the material does not pile up if the machine is stopped.

How the machine travels

To prepare the machine for traveling, all digging wheels and the cutting edges are hydraulically raised and retracted against the frame to conform to AAR clearance specifications. For operation, the digging wheels are extended outward and lowered, and the track-support assembly is used to raise the track while the cutting edges are moved into working position then turned inward beneath the track and locked.

The depth of the cutting edges is controlled hydraulically. Normally, both cutting edges are operated on the same plane but on curves the outer edge can be raised slightly to shape the subgrade in accordance with the curve superelevation.

The Undercutter-Cleaner loads itself on a flat car for transportation between widely separated job sites. This is done by four hydraulic jacks, one near each corner of the unit. These raise the machine high enough for the trucks to be rolled out and the flat car to be spotted beneath the machine.

• **The GN project.** In the demonstration on the GN, the machine was scheduled to work on the No. 4 and No. 5 freight mains. Work was started Oct. 20 and completed Nov. 2. The goal was to cut out the old fouled ballast deep enough to permit four inches of stone ballast to be placed under the ties, while maintaining the existing grade.

In this work, all old ballast was being wasted because it was comprised for the most part of dirt and cinders. The conveyor system had been adjusted on the machine so that the excavated material by-passed the screens and was being loaded directly into air-dump cars on an adjacent track.

Behind the machine the GN was working a Pullman-Standard tie spacer and a Nordberg Trakliner with a Line Indicator. A section force comprised of a foreman and eight men was alternately tapping down high spikes ahead of the Undercutter-Cleaner and installing new ties behind it. The general tie condition was good, so few ties required renewal.

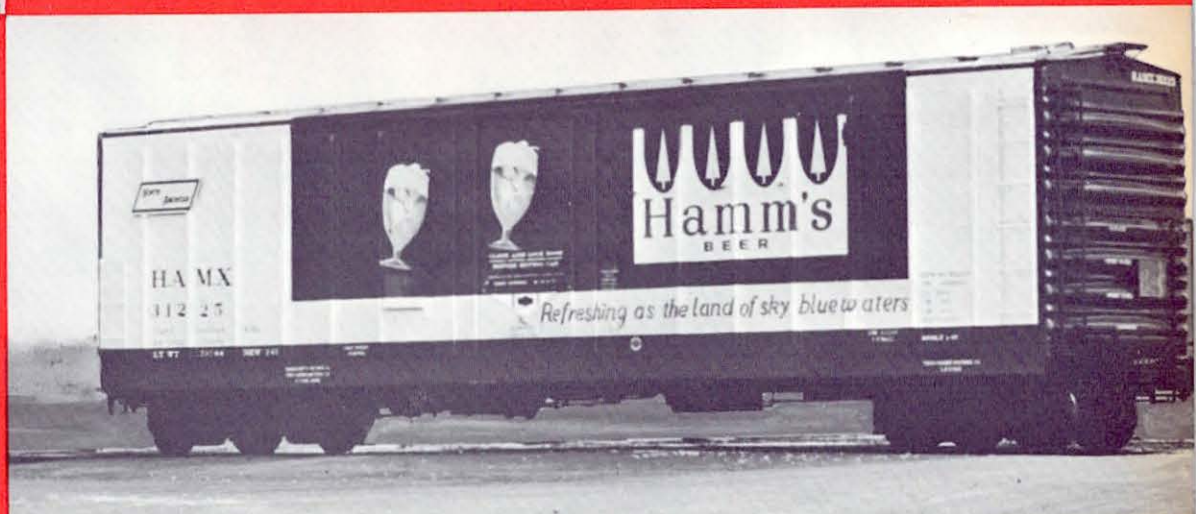
Ballast was unloaded at the end of each day's work to fill the cribs so the track could be used at night by traffic. The track was raised and tamped later by an Electromatic Junior tamper. A Ballast Regulator assisted in shaping and dressing the ballast.

• **Performance up 20%.** From the standpoint of the manufacturer, the purpose of the work was to demonstrate the performance and capability of the redesigned unit. For one thing, its designed production rate while undercutting and cleaning ballast has been increased about 20%.

In service on the GN, reports a Mannix spokesman, the machine was timed over a group of 33-ft rails and averaged 2½ minutes per rail length. This is equivalent to 792 ft per hr. Under different conditions than those encountered during the demonstration a considerably higher rate can be attained, said the spokesman. ■

Circle 18 on reader service card ▶

Over 3,000 void-free cars equipped with LANDRETH Pre-molded Urethane foam Panels*



*Patents Pending

Reduce labor costs with easy-to-install LANDRETH Pre-molded Urethane foam Panels

Landreth continues to pioneer new equipment and systems for the transportation industry. Landreth's experienced engineers have dedicated over 60 years of service to the railroads as well as to the research and development of quality, labor-saving, and profit-making systems and products.

Our modern plants operating under controlled laboratory conditions, supervised by trained engineering specialists to insure the best possible insulation to suit your custom needs.

Ten foam machines, equipped to provide uniform volume and temperature control of the feed streams insure fast and efficient production.

Now you can free capital that would normally be invested in special facilities, research laboratories, engineering, and labor.

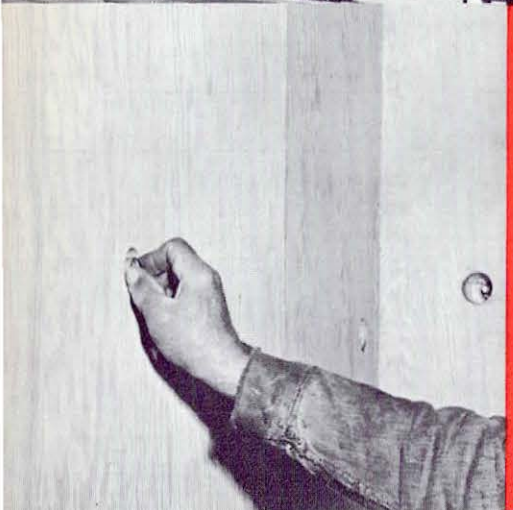
How to reduce costs and increase efficiency

1 Workmen lowering end panel into place. Panels are moved into production line on freight cars and lifted into cars on cranes.

2 Workmen lowering side panel into place.

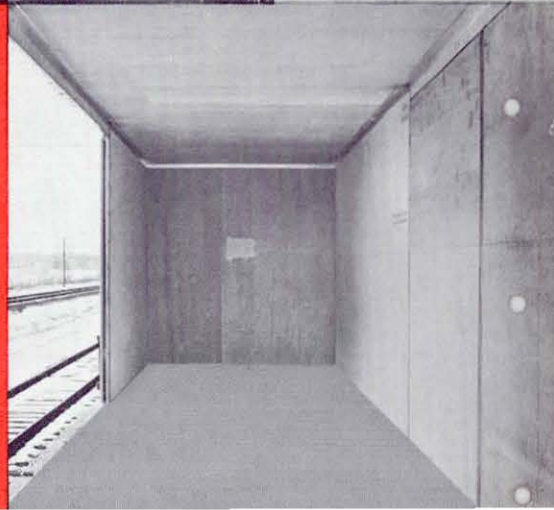
3 Workmen fitting side panels into place. Only 14 panels per car—panels are pre-trimmed, complete and ready to bolt into place for the sides, ends, ceiling, floor, and door.

4 Workmen fastening "Nelson" stud to outside post. Insulation thickness is reduced by ½ over conventional insulation materials.



5 Workmen inserting attaching device which when tightened, secures panel to side of car. This effective fastening system provides fastening without the normally associated heat loss.

6 Finished car. All joints foamed to insure a complete air-tight car.



Landreth panels increase insulation efficiency and cut costs

The new Landreth Pre-Molded Urethane Foam Panel enables railroads and car builders to build a better car faster and with less man hours in their shops.

The new Landreth system enables the builder to provide a Urethane Foam car without the necessity of installing special machinery and costly facilities.

Landreth Pre-molded URETHANE foam Panels engineered and proven best by test

The Inside Story of Budd Report #2238

The Landreth Insulated Car equipped with Landreth's Pre-Molded Urethane Foam Panels has just undergone exhaustive tests. After six months of road tests, the car was tested in The Budd Company testing laboratories in Philadelphia.

Here are the startling results from the Budd Laboratory's report.

The car constructed with the Landreth Pre-Molded Urethane Foam Panels was to be tested against two other cars constructed with Urethane Foam block. All the cars had been previously road tested for six months or longer.

The Landreth equipped car had absolutely no air leakage, no hot spots, and *no voids in the foam.* In addition, at 100 degrees differential, the car built with the Urethane Foam block had a BTU average of 143 BTU's per hour. The car equipped with the Landreth Pre-Molded Urethane Foam Panels also at 100 degrees differential and tested under the exact conditions, showed an average of just 93 BTU's per hour.

The Landreth Insulated Car was at least 50% more efficient than the car constructed with foam block. Conclusive proof that the Landreth Pre-Molded Urethane Foam Panel—is "Best by Test"!

Reduce labor costs with easy-to-install Landreth pre-molded Urethane foam panels*

Landreth Pre-Molded Urethane Foam Panels provide a lower K factor, as low as 0.11 (BTU's/sq. ft./hr./°F/in.) at 70 degrees as compared to 0.23 for conventional insulation. Over 90% of Urethane cells are closed. Thus, locking out moisture.

Check these features that make LANDRETH pre-molded Urethane foam panels*— best by test!

- ★ No Air Infiltration
- ★ No Localized Hot Spots
- ★ Non-Burning Foam
- ★ Easy Repairs
- ★ Seamless Vapor Barrier
- ★ Greater Thermal Efficiency
- ★ Thinner Walls
- ★ Completely Pre-Fabricated
- ★ Guarantee No Voids
- ★ All Joints Foamed
- ★ No Moisture Absorbtion
- ★ Odor Free and Non-Toxic
- ★ Fungus and Rot Proof
- ★ Added Structural Rigidity
- ★ Improves With Age—Does Not Deteriorate
- ★ Fire Proof
- ★ Does Not Split or Settle From Road Vibration or or Temperature Change

Highest quality controlled Urethane material on the market today

*Patents Pending

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Trucks equipped with the best Stabilizer you can buy are actually less expensive!

Specify Barber for—

- *savings in first cost*
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EXPERIENCE ■ RESEARCH ■ RESULTS

BARBER

Circle 19 on reader service card

If you want to know how long 800 new hopper cars will last . . . check their older brothers

These are jumbo 100-ton cars specially built to take the rugged battering of daily operation in unit coal hauling by the Southern Railway System and still give low maintenance and long life. The bodies are made of USS COR-TEN High-Strength Low-Alloy Steel—the steel with built-in atmospheric corrosion resistance.

Let's look at the records. Thousands of the original boxcars and hopper cars built of USS COR-TEN Steel in the Forties are still in service and bringing in revenue for their owners. They've paid for themselves many times over.

USS COR-TEN Steel sets durability records because its resistance to atmospheric corrosion is 5 to 8 times that of carbon steel. It forms a dense, tight oxide coating that inhibits further corrosion. The coating even forms again if scratched. As a further bonus, when COR-TEN Steel is painted, paint lasts about double the usual life span.

USS COR-TEN Steel saves money in railroad equipment of all types. In designing for extra payload capacity, USS COR-TEN Steel's high minimum yield point of 50,000 psi can provide weight savings of 15 to 25%; however, with today's emphasis on durability, COR-TEN Steel is often used in the same thickness as carbon steel, rather than as a weight saver. Its modulus of elasticity is 29,000,000 psi, so you get ample stiffness in structural members. USS COR-TEN Steel is available in all standard steel products—sheets, strip, plates, structural shapes, bars, bar shapes. Call our nearest district sales office, or write United States Steel, Room 8473, 525 William Penn Place, Pittsburgh, Pa. 15230. USS and COR-TEN are registered trademarks.

USS United States Steel: where the big idea is innovation

This mark tells you a product is made of steel.

Western Hemisphere's first automated urban mass transit system ...and he could run it

On April 28, 1967, the Montreal World Exhibition will unveil a new world wonder—an urban mass transit system so completely automated that an eight-year-old could boss the whole route. What's the heart of it? An integrated, highly sophisticated signal and control system designed and installed by WABCO's Union Switch & Signal Division.

Eight six-car trains will whisk as many as 30,000 visitors an hour over a 3½ mile route serving five Exhibition stations. All scheduling, dispatching, routing and braking will be governed by WABCO's Operation Control. This nerve center combines with other WABCO subsystems to monitor speeds and distances between trains with an accuracy and efficiency not possible with manual controls.

Transit modernization brought within reach by WABCO's "Building Blocks"

A city faced with the problem of bridging the gap between an older transit system and a completely automated system can accomplish this task by tackling it *in increments*. By replacing obsolete equipment with modern WABCO "building block" devices on a piecemeal basis, service, safety and efficiency gradually improve *without* straining the budget. Recent WABCO innovations in this field include a revolutionary suspension system, new automatic switches, couplers and braking systems (electric or air), plus computerized dispatching, routing and speed controls.

WABCO's Mass Transit Center has a full range of experience to lend to your problem—from early-stage guidance in funding transit projects to the most advanced technology in improving the efficiency of a system. A WABCO engineering team would like the chance to discuss your transit needs with you. Write or call: *WABCO Mass Transit Center, Westinghouse Air Brake Co., Pittsburgh, Pa. 15218. • 412-242-3434*

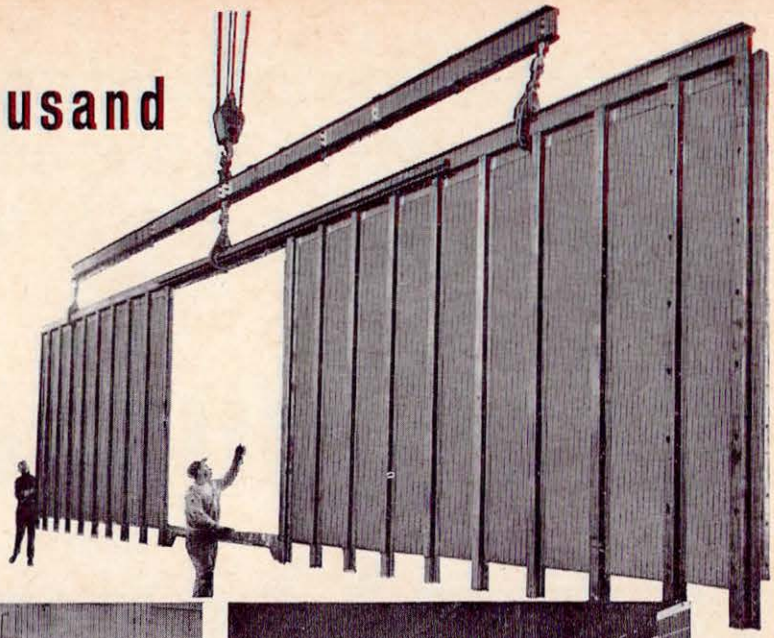
WABCO
MASS TRANSIT CENTER

Circle 28 on reader service card

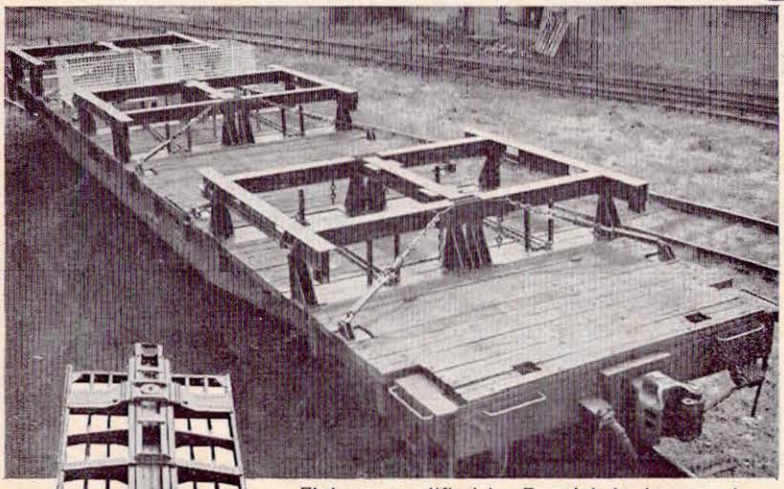
Photos worth a thousand words? Well . . .

anyway they show you we're in the business of building car components to tight customer specs. That saves a lot of explaining. But, there's still a lot unsaid about our timely delivery.

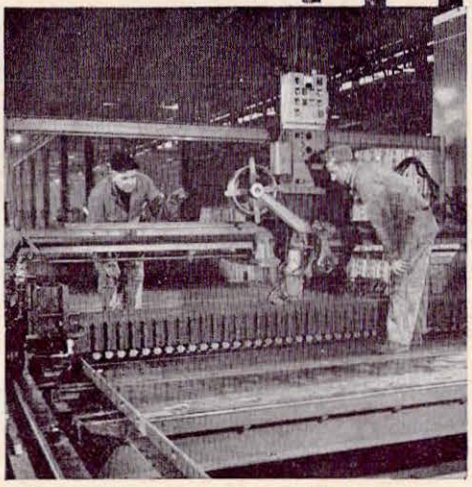
Actions speak louder than words. How 'bout a crack at your next order?



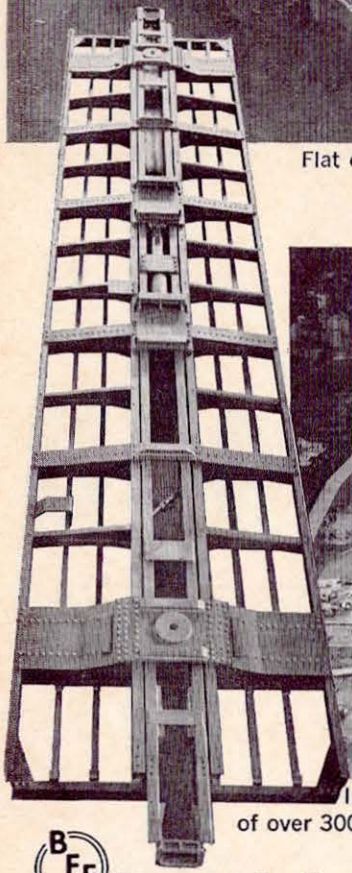
One of 1200 car sides built for a large northeastern railroad.

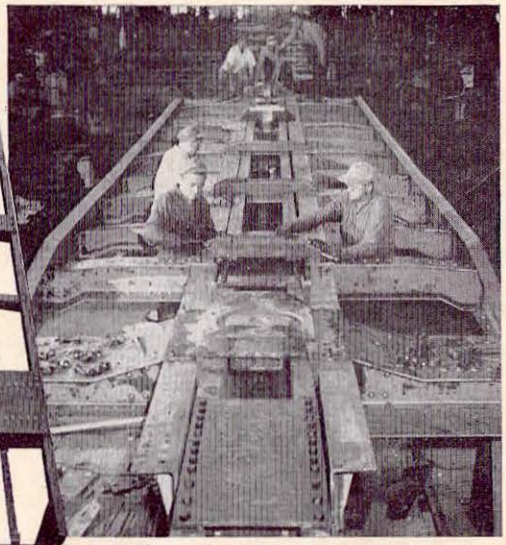


Flat car modified by Berwick to transport '65 auto frames.

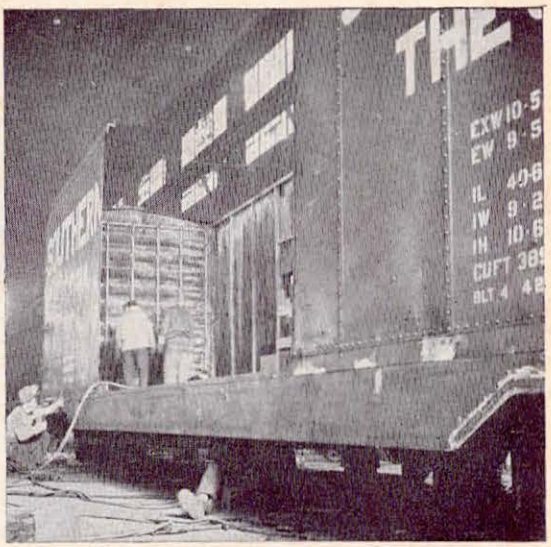


Automatic equipment used in car side welding.





Installation of cushioning unit in one of over 3000 underframes built in the past year.



A car being "stretched" from 40' to 50' will be completely reconditioned before delivery.

BFF

Berwick Forge and Fabricating Corporation

Berwick, Pennsylvania Chicago office: 80 E. Jackson Blvd.

Circle 13 on reader service card

after 3 years of development and 500 locomotive months of testing on two major railroads in different parts of the country...

Gulf announces the first completely ashless railroad diesel lubricating oil...

Gulf Dieselmotive 470

Circle 21 on reader service card

FROM GULF comes the first and only completely ashless, highly dispersant oil for diesel locomotives. Dieselmotive 470 eliminates right-of-way fires attributed to conventional lubricating oils containing metallic additives. And, it is the only oil available which provides you with these outstanding performance features:

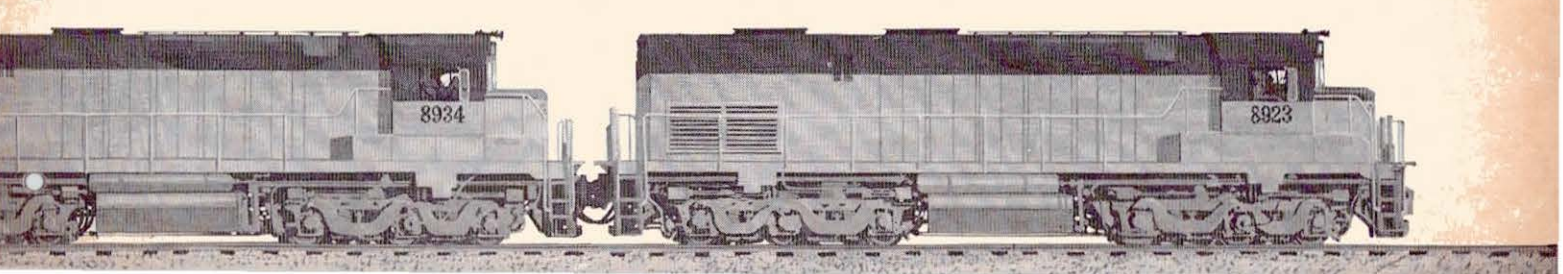
1. Increases filter element life by at least 300%. (In actual field tests filter element life increased as much as 600%.)
2. Engines stay unusually clean, thus dramatically reducing engine cleanup during overhaul.
3. Maintains oil cooler efficiency by eliminating passage-deposits that interfere with proper heat transfer.
4. Provides water contamination safety factor. (Additives are not affected by water so they do not dump-out when contaminated.)
5. Has extra high stability and anti-oxidation characteristics.
6. Provides superior lubrication and protection for silver bearings.

Remember, this is the *first* completely ashless lubricating oil for diesel locomotives. And only Gulf has it.

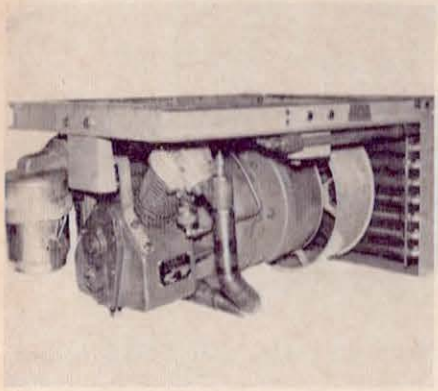
For more information on this outstanding new oil, write, wire or phone: GULF OIL CORPORATION, Department DM20-12, Gulf Building, Houston, Texas 77002. Telephone: area code: 713 CA 5-3141, ext. 2196.

Gulf®

Gulf makes things run better!



NEW PRODUCTS REPORT

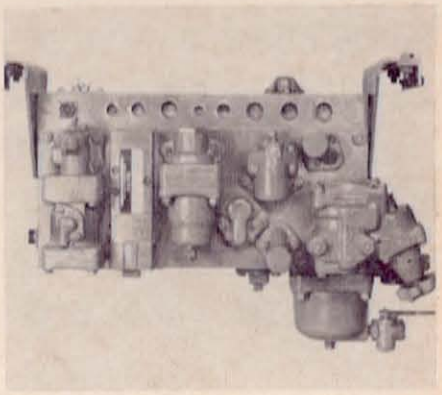


Air Compressor (RA-1)

The D-3 air compressor supplies the control medium and the "muscle" for the RT-2 electro-pneumatic brake system used in rapid-transit service. The new model is 50% smaller in size and weight—850 vs 1,325 lb—than present standard models. Noise has been reduced three decibels from former levels of operation. Because of low output temperatures, a minimum of water is transmitted to the brake equipment. Compressed-air output has not been reduced. *Westinghouse Air Brake Co.*

Microwave System (RA-2)

A new solid-state, 6 kmc microwave RF equipment provides a transmision medium capable of toll quality performance utilizing companion single-sideband or FM carrier equipment. It will handle voice, telemetering, facsimile and data communications. A complete basic terminal occupies only 22¾ inches of space on a standard 19-inch rack, and requires less than 70 watts from a 24-volt battery system. It can operate from 48 volts DC or 120 volts AC. *Motorola, Inc.*



Brake System (RA-3)

The "E" Type operating unit of the RT Electro-pneumatic brake system used in rapid-transit service regulates, in response to signals from manually controlled Cineston controller, the amount of air pressure supplied to brake units at each wheel. Air pressure, in turn, provides stopping force behind brake shoes as applied to wheels to stop the train. Individual elements can be replaced on the lightweight pipe bracket without breaking any pipe connections. *Wabco.*

Telephone Systems (RA-4)

Series 5, 6 and 7 private automatic exchanges are designed to operate in conjunction with multi-line pushbutton telephones. They are particularly suited for serving satellite locations requiring minimum stations and access to a telephone dial system network via tie line trunks arranged for loop or E&M signaling. Series 5, for example, provides 28 lines and 4 talking paths, while series 6 has unlimited capacity, of both lines and talking paths. *Stromberg-Carlson Corp.*

Graphite Lubricant (RA-6)

Slip-Plate No. 3 (railroad grade) has been developed for effective switch plate lubrication. Specifically, it was formulated for those applications which require better sprayability, improved suspension, faster drying time and increased corrosion resistance. Slip-Plate No. 3 is also recommended for use on buffer assemblies, lock mechanism on piggyback cars, center plates and diaphragms, according to the manufacturer. *Superior Graphite Co.*

New Generators (RA-5)

Increased power output in the ranges of 10% to 20% are new improvements made in a commercial product line of thermo-electric generators. Four models can now provide power levels of 9, 15, 23 and 50 watts. The generators are designed to operate on propane, butane, or natural gas fuels. The generators and converter-limiter accessories deliver the power at nominal levels of 6, 12 or 24 volts as required. *Minnesota Mining & Manufacturing Co.*

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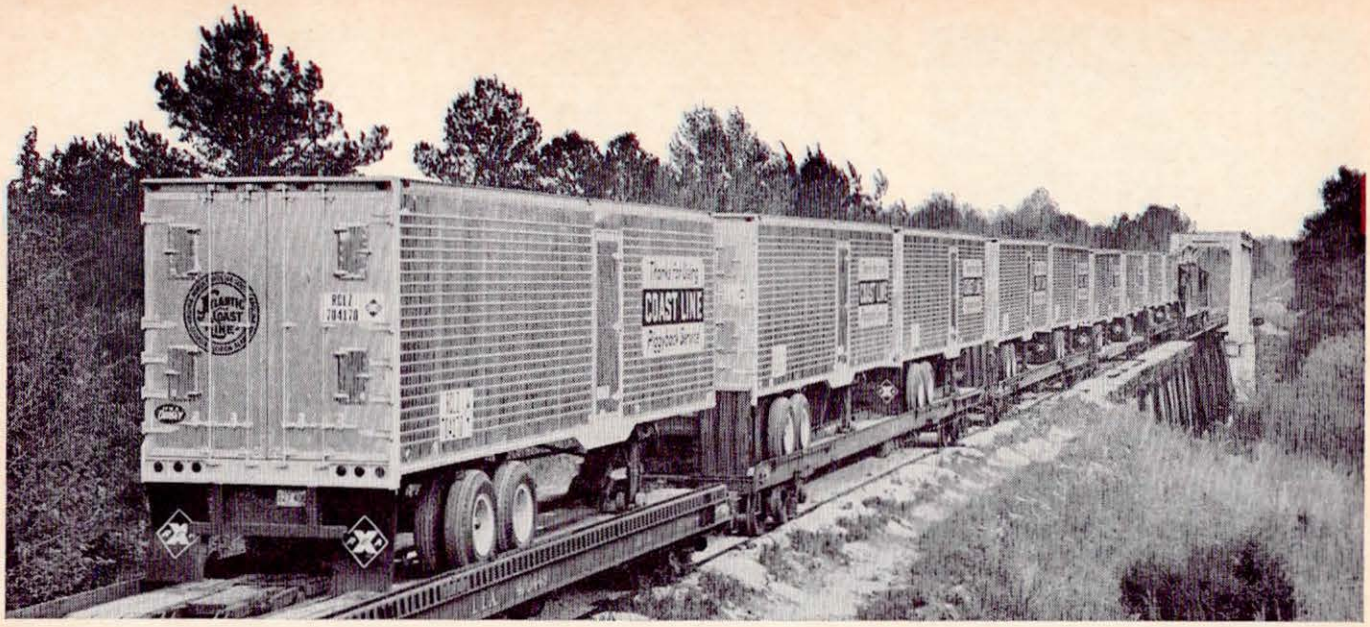

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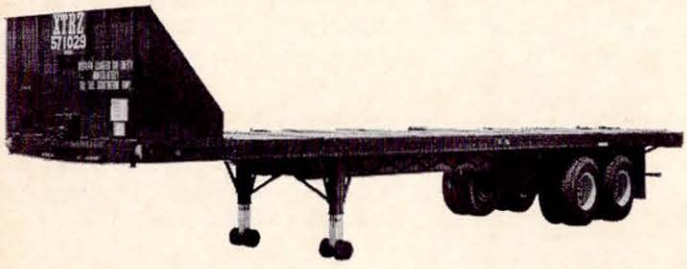

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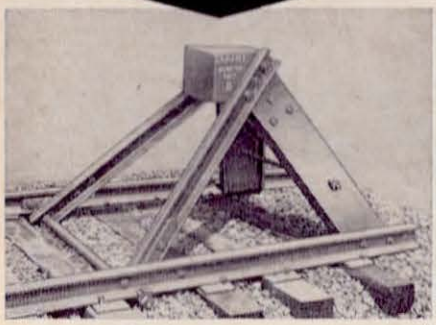

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Dividends Declared

ATLANTIC COAST LINE.—75¢, increased, quarterly; $1.25, extra, both payable Dec. 13 to holders of record Nov. 4.

CHESAPEAKE & OHIO.—$1, quarterly, payable Dec. 20 to holders of record Dec. 1.

CHICAGO & EASTERN ILLINOIS.—2-for-1 stock split, subject to approval of Interstate Commerce Commission and shareholders. Shareholders will vote Jan. 14.

CLEVELAND & PITTSBURGH.—7% Preferred, 87½¢, quarterly; 4% Preferred, 50¢, quarterly, both paid Dec. 1 to holders of record Nov. 10.

DELAWARE & HUDSON.—35¢, increased, quarterly, payable Dec. 28 to holders of record Dec. 10.

DENVER & RIO GRANDE WESTERN.—27½¢, increased, quarterly, payable Dec. 13 to holders of record Dec. 3.

ERIE & PITTSBURGH.—Guaranteed, 87½¢, quarterly, payable Dec. 10 to holders of record Nov. 30.

GULF, MOBILE & OHIO.—55¢, increased, quarterly; 95¢, extra, both payable Dec. 13 to holders of record Nov. 23; Preferred, $1.25, quarterly, payable June 13, 1966, to holders of record May 25.

LOUISVILLE & NASHVILLE.—$1, increased, quarterly; $1.75, extra, both payable Dec. 13 to holders of record Nov. 1.

NORFOLK & WESTERN.—$1.50, quarterly; 50¢ extra, both payable Dec. 10 to holders of record Nov. 12.

NORTH PENNSYLVANIA.—$1, quarterly, paid Nov. 25 to holders of record Nov. 18.

PENNSYLVANIA.—40¢, extra, quarterly; 85¢, year-end, both payable Dec. 23 to holders of record Dec. 9.

PITTSBURGH, FORT WAYNE & CHICAGO.—7% Preferred, $1.75, quarterly, payable Jan. 4 to holders of record Dec. 10.

PITTSBURGH, YOUNGSTOWN & ASHTABULA.—7% Preferred, $1.75, quarterly, paid Dec. 1 to holders of record Nov. 19.

SOUTHERN.—70¢, quarterly; Preferred, 25¢, quarterly, both payable Dec. 15 to holders of record Nov. 15.

SOUTHERN PACIFIC.—37½¢, quarterly, payable Dec. 13 to holders of record Nov. 29.

UNION PACIFIC.—45¢, quarterly, payable Jan. 3 to holders of record Dec. 6.

Current Publications

BULLETIN NO. 113. 106 pages, illustrations, drawings. The Railway & Locomotive Historical Society, Inc., Baker Library, Harvard Business School, Boston, Mass. 02163. $2 to members; $3 to non-members.

INNOVATIONS IN RAILROAD TREASURY OPERATIONS. 81 pages, illustrations. Railway Systems & Management Association, 163 E. Walton St., Chicago, Ill. 60611. Flexible cover, $5; case binding, $8.25.

RAILS TO THE RISING SUN, by Charles S. Small. 135 pages, illustrations. Golden West Books, P.O. Box 8136, San Marino, Cal. 91108. $7.95.

RAILROAD CALENDAR OF AMERICAN STEAM LOCOMOTIVES. Golden West Books, P.O. Box 8136, San Marino, Cal. 91108. $1.50.

PRINCIPLES AND TECHNIQUES OF PREDICTING FUTURE DEMAND FOR URBAN AREA TRANSPORTATION, by Brian V. Martin, Frederick W. Memmott, III, and Alexander J. Bone. 214 pages, tables, charts. M.I.T. Report No. 3. The Massachusetts Institute of Technology Press, Cambridge, Mass. 02142. $6.

STEEL RAILS TO THE SUNRISE; The Long Island Rail Road, by Ron Ziel and George H. Foster. 320 pages, illustrations. Duell, Sloan and Pearce, 60 East 42nd Street, New York 10017. $12.95.

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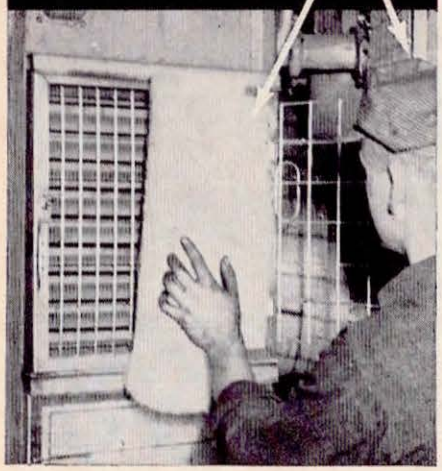

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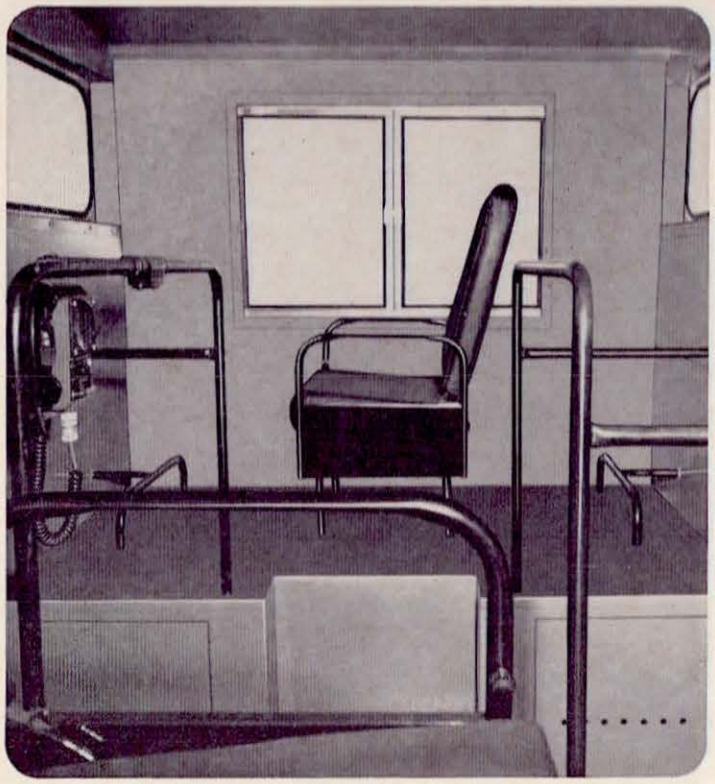

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PEOPLE

ATLANTIC COAST LINE.—**S. E. Sory** appointed assistant freight claim agent and **R. T. Cribb** named supervisor freight loss and damage prevention, Jacksonville, Fla.

BURLINGTON.—**Ernest L. Potarf,** vice president of the operating department, retired Nov. 30 after 45 years of service.

CANADIAN NATIONAL.—**T. E. Dolphin,** project engineer (access line), Toronto Terminal Project, appointed special projects engineer, Great Lakes Region, Toronto, and his former position abolished.

O. George Hancocks, formerly editor, Canadian Homes Magazine, appointed employee communications officer, Great Lakes Region, Toronto.

G. Carra, employee relations assistant, Montreal Area, appointed assistant labor relations officer, St. Lawrence Region, Montreal, succeeding **P. J. Thivierge,** promoted.

CHESAPEAKE & OHIO—BALTIMORE & OHIO.—**William F. Dadd,** named assistant chief mechanical officer—locomotive, and **William A. Mullen** appointed assistant chief mechanical officer—car, C&O-B&O, Baltimore. Mr. Dadd was formerly general superintendent—motive power, B&O, and Mr. Mullen was general superintendent rolling stock and special equipment, B&O. **William C. Reister** named assistant general superintendent—car department and **Corbin N. Hammond, Jr.,** appointed supervisor passenger car maintenance, Baltimore. Mr. Reister formerly was superintendent car inspection and maintenance, and Mr. Hammond, supervisor car maintenance, B&O.

Charles M. Machin, Jr., named chief electrical engineer for both roads; **A. Matthew Schuh,** senior engineer mechanical facilities, and **Charles C. Shelleman,** assistant superintendent air brakes. They will perform duties for both the car and locomotive departments of the two roads. Mr. Machin had been electrical engineer, B&O; Mr. Schuh, engineer mechanical appliances, and Mr. Shelleman, supervisor air brakes, B&O.

John F. Stevens named superintendent—refrigeration services, C&O-B&O, after serving as vice chairman, B&O's rules committee.

Robert W. Kirk, sales representative, Minneapolis, Minn., appointed district sales manager, Charlotte, N.C., succeeding **A. G. Daughtrey,** who retired after more than 41 years of service with the C&O.

D. G. Wooden, director of costs and economic research, B&O, Baltimore, appointed director of cost research, C&O-B&O there. **W. B. Wright,** director of economic and

(Continued on page 61)

MARKET OUTLOOK

Carloadings

Loadings of revenue freight in the week ended Nov. 27 totaled 520,580 cars, the Association of American Railroads announced on Dec. 2. This was a decrease of 81,373 cars, or 13.5%, compared with the previous week; an increase of 16,449 cars, or 3.3%, compared with the corresponding week last year; and an increase of 53,507 cars, or 11.5% compared with the equivalent 1963 week. Ton-miles generated by carloadings in the week ended Nov. 27 are estimated at 12.3 billion, an increase of 7.4% above the corresponding week of 1964, and 20% above the 1963 week.

REVENUE FREIGHT CARLOADINGS
For the week ended Saturday, Nov. 27

District	1965	1964	1963
Eastern, including Allegheny and Pocahontas ..	208,517	204,349	184,045
Southern	107,885	100,025	92,774
Total Eastern and Southern Districts	316,402	304,374	276,819
Northwestern .	62,065	60,301	57,228
Central Western	105,177	106,452	100,263
Southwestern .	36,936	33,004	32,763
Total Western Districts	204,178	199,757	190,254
Total All Roads	520,580	504,131	467,073
Commodities:			
Grain and Grain products	51,988	43,842	45,856
Livestock	2,642	3,371	2,683
Coal	109,127	99,915	84,741
Coke	6,881	9,452	6,921
Forest Products	34,582	31,204	31,533
Ore	27,322	27,110	24,388
Merchandise l.c.l.	6,904	9,268	12,149
Miscellaneous .	281,134	279,969	258,802
Nov. 27	520,580	504,131	467,073
Nov. 20	601,953	599,529	586,095
Nov. 13	604,645	618,254	588,615
Nov. 6	619,480	619,847	594,769
Oct. 30	634,862	647,502	622,679
Cumulative total, 48 weeks	27,364,695	26,945,663	26,900,931
Estimated revenue ton-miles (billions) 48 weeks	644	611	578

PIGGYBACK CARLOADINGS—U.S. piggyback loadings for the week ended Nov. 20 totaled 21,802 cars, compared with 18,467 for the corresponding 1964 week. Loadings for 1965 up to Nov. 20 totaled 934,009 cars, compared with 808,922 for the corresponding period of 1964.

IN CANADA—Carloadings for the seven-day period ended Nov. 14 totaled 79,423 cars, compared with 83,067 for the previous seven-day period, according to the Dominion Bureau of Statistics.

	Revenue Cars Loaded	Total Cars Rec'd from Connections
Totals for Canada		
Nov. 14, 1965	79,423	24,372
Nov. 14, 1964	76,313	22,146
Cumulative Totals		
Nov. 14, 1965	3,452,146	1,087,958
Nov. 14, 1964	3,455,089	1,055,798

FREIGHT-TRAIN CARS

► *Great Northern.*—Ordered five 100-ton bulkhead flat cars, 70-ft long between bulkheads, and equipped with Brandon tie-down equipment, from Thrall Car for delivery in July 1966.

► *Louisville & Nashville.*—Ordered 1,000 box cars and 10 covered hopper cars at a cost of $16 million for second-quarter 1966 delivery. Pullman-Standard will build 400 50-ft, 70-ton box cars with 10-ft doors and 100 50-ft 100-ton box cars with 16-ft doors, all cars to be equipped with lading-protection devices. General American will build 500 50-ft, 70-ton box cars with 10-ft doors and 10 4,180-cu-ft-capacity Airslide covered hopper cars. L&N will also rebuild 600 40-ft, 50-ton box cars at South Louisville, Ky., company shops.

► *Norfolk & Western.* Ordered 1,000 95-ton all-steel hoppers, to be built in company shops at a cost of $10.5 million. Construction of the cars will begin in February when delivery of an earlier order is completed. The order will keep production facilities busy until next June.

LOCOMOTIVES

► *Louisville & Nashville.*—Will order 16 high-horsepower, six-axle, diesel-electric locomotives for 1966 delivery. Cost is estimated at $5 million. In addition, L&N will repower 25 switching units.

NEW FACILITIES

► *Illinois Central.*—Ordered radio equipment from Union Switch & Signal division of WABCO consisting of 29 base station sets and 71 2R54 units for use on locomotives.

► *Jersey Central.*—Has installed an on-track electronic scale to automatically weigh each car of unit coal trains as they enter Jersey City Yard near CNJ's Pier 18 coal dumping facility. Coal is transshipped from this point via barges to New York Harbor and Long Island Sound points. Some four million tons of coal are dumped at Pier 18 annually.

► *Northern Pacific.*—Will spend almost $3.5 million on signal and communications improvements in 1966. More than $2.5 million will go for signals and interlocking improvements. Two major projects involve CTC installations between Castle Rock and Vancouver, Wash., and completion of a CTC installation between Paradise and Tuscor, Mont. Communications expenditures of $906,000 in 1966 call for, in addition to other projects, installation of microwave between St. Paul and Fargo, N.D.

► *Northern Pacific.*—Will relay about 108 miles of main line track, of which 81.5 miles will be with 115- and 132-pound continuous welded rail at a cost of $6.3 million; 42 miles of branch line relay costing $595,000 and main line ballasting and bank widening at a cost of $370,000. Additional yard tracks, sidings and industry tracks will cost more than $1.5 million, the bulk of which will be spent on the first phase of an expansion of Missoula, Mont., yard facilities. Nearly 75% of this $2 million project is scheduled to be completed in 1966. New shop buildings and other structures will cost $740,000.

YOU OUGHT TO KNOW

Pennsylvania hikes dividend: An improvement in earnings has prompted the Pennsylvania to increase its quarterly dividend from 25¢ to 40¢ per share—and add a year-end extra dividend of 85¢ a share. The increase, highest since the war years of 1942-45, brings PRR's dividend payments for the year to $2 a share, compared to $1.25 last year. Chairman Stuart T. Saunders said '65 earnings will show a good improvement over 1964, but "we are experiencing some loss in rail traffic during the fourth quarter because of the decline in steel industry shipments." He said that from a long-term standpoint "our earnings are still far from satisfactory," pointing out that in the year ended September 30 net railway operating income amounted to only a 1.93% return on investment in railroad properties.

Evans to expand car-building facility: A $3 million plant expansion of the Evans Products Company's Transportation Equipment Division plant at Plymouth, Mich., was announced last week by James J. Conway, vice president and division manager. He said the work will include $2.5 million to expand production space from 57,000 square feet to about 300,000 square feet, and the balance will be spent for machinery and equipment. The expansion will increase plant capacity from five cars a day to 10.

CB&Q likes it downtown: With the decline of the passenger business, the downtown ticket office has dropped off in popularity with a number of roads—but not Burlington. CB&Q's city office in the heart of Chicago's Loop celebrated its 25th anniversary Dec. 1—with business steadily climbing. In the office's first year, ticket sales amounted to $762,700. The first million-dollar year came in 1944, a post-war peak of $1.5 million was reached in 1949. Then, after a slight slump, sales started climbing again in '56. Sales hit $2 million in 1959, topped $3 million in 1962 and will probably be close to $3.5 million this year, according to W. F. Burke, Burlington's general passenger traffic manager.

USDA 4-H Award to C&NW: The Cooperative Extension Service of the U.S. Department of Agriculture is awarding the Chicago & North Western its highest award for that road's outstanding support of 4-H Club work. The "Crested Clover Citation" was for C&NW's support since 1923 of the 4-H movement, with college scholarships given to youngsters in the road's nine-state territory.

Regulation, past and present: Successful transportation regulation, as the ICC's Kenneth H. Tuggle sees it, "must be willing to abandon precedent no longer useful, no matter how adequate it was for problems of a former generation." Tuggle, addressing a Transportation Association of America institute in St. Louis, also touched on the Commission's current study of the "mysteries of costs." Use of costs as a determinant in important cases, he noted, "has opened up a wide field of controversy. Through our study we hope to find the proper place for costs in the complex transportation problems of our time and to arrive at acceptable procedures and techniques for reflecting them, with proper perspective, in our regulatory decisions."

Vibrator research program set up: A facility for testing hopper car vibrators and shake-out devices under actual conditions has been established at Neponset, Ill., by Martin Engineering Co. in cooperation with the Vibrating Equipment Manufacturers Association and the AAR. Extensive tests to determine the effects of vibration on cars are being conducted on a 125-foot track with a 50-ton hopper car and a continuous recirculation system. Minimizing damage to bulk materials cars caused by vibrators—a goal of car owners, shippers and receivers—is possible, Martin Engineering reports, with the proper selection, application and mounting of vibrators.

Truck tonnage. Intercity truck tonnage in the week ended November 20 was 0.2% above that of the previous week, and 7.2% ahead of the volume in the corresponding week of 1964, according to American Trucking Associations.

Current statistics

Net Income	
9 mos., 1965	$540,000,000
9 mos., 1964	500,000,000
Carloadings, revenue freight	
48 wks., 1965	27,364,695
48 wks., 1964	26,945,663
Freight cars on order	
Nov. 1, 1965	41,612
Nov. 1, 1964	30,351
Freight cars delivered	
10 mos., 1965	65,939
10 mos., 1964	56,564
Serviceable cars	
Nov. 1, 1965	1,402,607
Nov. 1, 1964	1,404,590

(Continued from page 58)

cost research, C&O, Cleveland, appointed director of profit margin research, C&O-B&O, there. **D. S. Bradley** appointed director, data processing services, for both roads.

The following C&O-B&O appointments also have been made:

At Huntington, W. Va., **Charles Ross,** general supervisor passenger car maintenance; **A. B. Ray,** general car supervisor; **E. F. Stark,** engineer mechanical facilities; **E. E. Slack,** general superintendent car department; **R. J. Dewsbury,** superintendent air brakes; **C. R. Bland,** superintendent motive power.

At Raceland, Ky., **W. B. Chellis,** manager, heavy car shops.

Headquarters of the C&O-B&O Safety and Fire Prevention Dept. and the Operating Rules Committee will be in Baltimore, Md. **R. W. Cassidy** is superintendent, safety and fire prevention of both roads and **H. E. Middlekauff** is chairman, C&O-B&O Operating Rules Committee.

COTTON BELT.—**C. H. Jacques,** assistant freight traffic manager, St. Louis, retired Nov. 30 after 45 years of service.

DENVER & RIO GRANDE WESTERN.—**Boyd M. Muncy,** office manager, Houston, Tex., appointed district freight and passenger agent there, succeeding **Ted L. Rudmann.** Mr. Rudmann named general agent, Houston, succeeding **John B. Latimer,** general agent at Dallas, who retired Oct. 31 after 35 years of service.

ELGIN, JOLIET & EASTERN.—**Gerard L. Gaumond** elected treasurer, Chicago, to succeed **Paul B. Higdon,** resigned. Mr. Gaumond will continue to serve as assistant secretary. **Norman L. Dupont** named manager-taxes, Joliet, Ill., succeeding **John A. Cox,** retired.

ERIE LACKAWANNA.—**James K. Weikal,** division engineer, Mahoning Division, Youngstown, Ohio, has been granted a leave of absence.

NEW YORK CENTRAL.—**J. A. Wetzel,** director terminals, New York, appointed director of operation planning there, a new position.

RICHMOND, FREDERICKSBURG & POTOMAC.—**James T. Rice,** auditor of expenditures, Richmond, promoted to manager data processing and customer service. **Ralston K. Smith,** accountant at Potomac Yard, Alexandria, Va., appointed auditor of expenditures.

WESTERN PACIFIC.—**Frank R. Woolford,** chief engineer, appointed consulting engineer to special projects. **Arthur W. Carlson,** engineer of bridges and structures, named chief engineer. **John C. Miller** appointed assistant chief engineer; **Charles E. Elliott,** engineer maintenance of way and structures; **Robert D. Nordstrom,** engineer of bridges and structures; **David C. Charlebois,** general supervisor of track, and **Clifford A. Gerstner,** office engineer.

Supply Trade

Prime Manufacturing Corp. has announced the establishment of the **Prime Manufacturing (Canada) Ltd.,** Montreal, under the direction of **Clifton S. Bryant.**

General American Transportation Corp. named **Stuart H. Moyes,** manager of technical services, Tank Car Division; **Albert E. Price,** chief engineer, Tank Car Division; **Lee H. Shils,** chief engineer, Freight Car Division.

B.A.R.T. plans super comfort-convenience to convert Californians to rail transit

Full-scale model of final BART car for evaluation of car body and seating design.

Laboratory car for comparative check of operational and control systems.

HOUDAILLE ride controls serve on test cars

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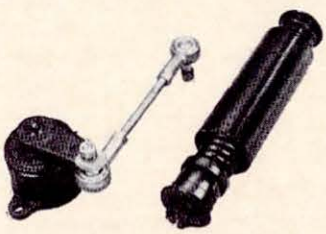

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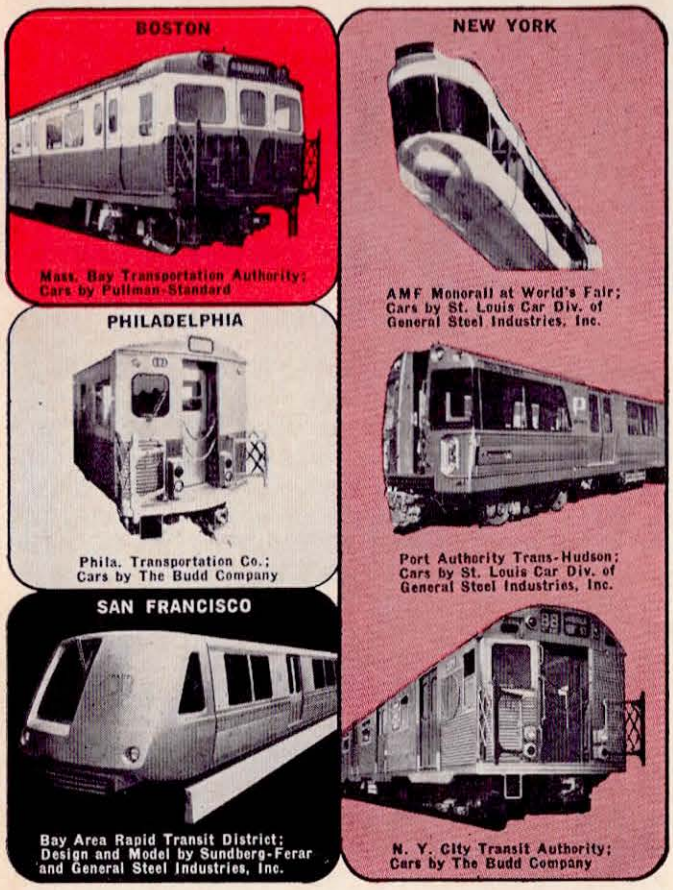
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EMPLOYMENT PROBLEM—I have seen a letter from Professor Newt Morton of Kent (O.) State University, in which he calls attention to the fact that, in the case of railroad mergers, protection of railroad jobs is provided—but there is no parallel protection of jobs in the trucking industry, when truck operations are merged.

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(Continued from page 58)

cost research, C&O, Cleveland, appointed director of profit margin research, C&O-B&O, there. **D. S. Bradley** appointed director, data processing services, for both roads.

The following C&O-B&O appointments also have been made:

At Huntington, W. Va., **Charles Ross,** general supervisor passenger car maintenance; **A. B. Ray,** general car supervisor; **E. F. Stark,** engineer mechanical facilities; **E. E. Slack,** general superintendent car department; **R. J. Dewsbury,** superintendent air brakes; **C. R. Bland,** superintendent motive power.

At Raceland, Ky., **W. B. Chellis,** manager, heavy car shops.

Headquarters of the C&O-B&O Safety and Fire Prevention Dept. and the Operating Rules Committee will be in Baltimore, Md. **R. W. Cassidy** is superintendent, safety and fire prevention of both roads and **H. E. Middlekauff** is chairman, C&O-B&O Operating Rules Committee.

COTTON BELT.—**C. H. Jacques,** assistant freight traffic manager, St. Louis, retired Nov. 30 after 45 years of service.

DENVER & RIO GRANDE WESTERN.—**Boyd M. Muncy,** office manager, Houston, Tex., appointed district freight and passenger agent there, succeeding **Ted L. Rudmann.** Mr. Rudmann named general agent, Houston, succeeding **John B. Latimer,** general agent at Dallas, who retired Oct. 31 after 35 years of service.

ELGIN, JOLIET & EASTERN.—**Gerard L. Gaumond** elected treasurer, Chicago, to succeed **Paul B. Higdon,** resigned. Mr. Gaumond will continue to serve as assistant secretary. **Norman L. Dupont** named manager-taxes, Joliet, Ill., succeeding **John A. Cox,** retired.

ERIE LACKAWANNA.—**James K. Weikal,** division engineer, Mahoning Division, Youngstown, Ohio, has been granted a leave of absence.

NEW YORK CENTRAL.—**J. A. Wetzel,** director terminals, New York, appointed director of operation planning there, a new position.

RICHMOND, FREDERICKSBURG & POTOMAC.—**James T. Rice,** auditor of expenditures, Richmond, promoted to manager data processing and customer service. **Ralston K. Smith,** accountant at Potomac Yard, Alexandria, Va., appointed auditor of expenditures.

WESTERN PACIFIC.—**Frank R. Woolford,** chief engineer, appointed consulting engineer to special projects. **Arthur W. Carlson,** engineer of bridges and structures, named chief engineer. **John C. Miller** appointed assistant chief engineer; **Charles E. Elliott,** engineer maintenance of way and structures; **Robert D. Nordstrom,** engineer of bridges and structures; **David C. Charlebois,** general supervisor of track, and **Clifford A. Gerstner,** office engineer.

Supply Trade

Prime Manufacturing Corp. has announced the establishment of the **Prime Manufacturing (Canada) Ltd.,** Montreal, under the direction of **Clifton S. Bryant.**

General American Transportation Corp. named **Stuart H. Moyes,** manager of technical services, Tank Car Division; **Albert E. Price,** chief engineer, Tank Car Division; **Lee H. Shils,** chief engineer, Freight Car Division.

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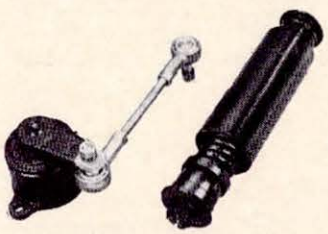

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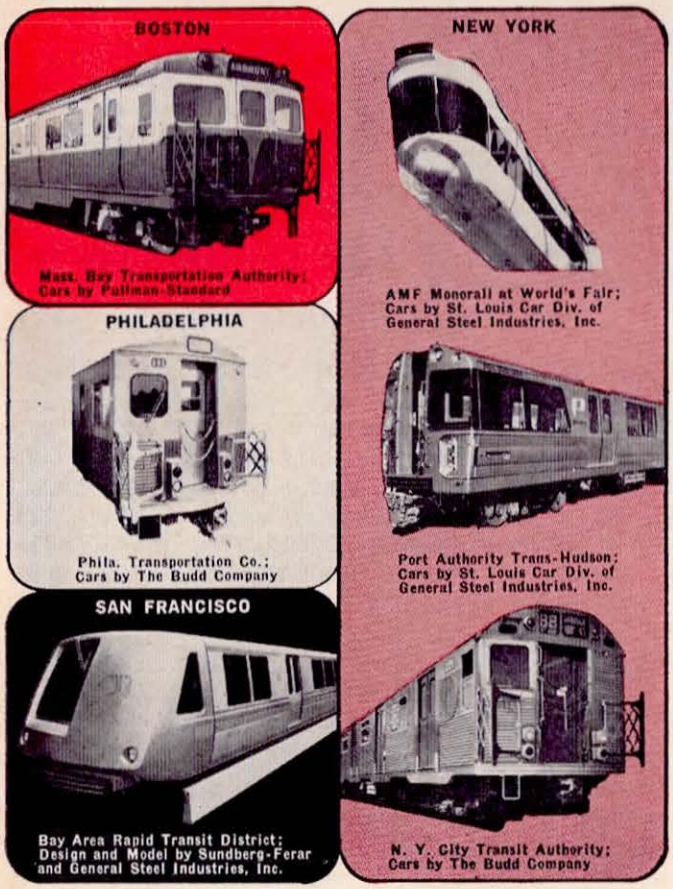
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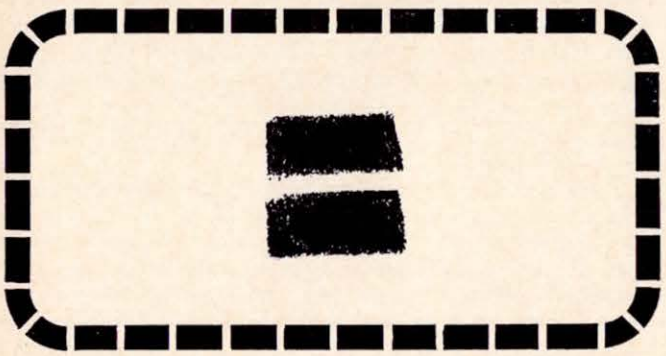

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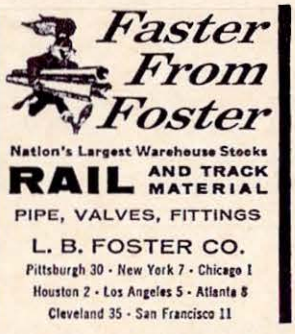

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THE ACTION PAGE

Mass transport—opportunity for railroads

Many authorities feel that preservation of the city citizen's personal mobility in the spreading metropolitan concentrations of the U. S. has become more than just a problem. Many experts say the problem is well on its way to being a crisis in the nation's domestic affairs. Campus protests, draft-card burning and the realities behind the war on poverty may prove, in the long run, to be less serious problems to U. S. society than the choking by car that afflicts all large cities. Railroad men will do well to keep on top of the fast-changing aspects of this problem.

Late last month a "Conference on our Environmental Crisis" attracted politicians, city planners, scientists, engineers, sociologists and transportation experts to Austin, Tex. Also late in November a top-drawer committee of 25 leaders from industry, labor, education and government met in Pittsburgh to draw up plans for the first international conference on urban transportation.

The automobile, of course, was the means whereby city dwellers got around the traditional time/distance limits that had acted as a brake upon city size since the Roman senate worried about the influx of dispossessed farmers into Rome. Freed from these historic limits, city citizens in automobiles have created suburbias almost without end.

Role of the city is threatened

The ensuing metropolitan sprawl, say some sociologists, is threatening the very essence of cities as fountainheads of civilization, as sources of most of mankind's scientific, cultural and technological progress. Economists are warning that society at large can hardly go on paying the skyrocketing costs of the concrete expanses and ancillary facilities needed to sustain an acceptable level of personal mobility by car in cities. Politicians are keenly aware of the submerged but large-scale hostility among various groups that work, live and play in our cities. Past antagonism between railroad commuter people and highway officials is small potatoes compared with the antagonisms that complicate the present environmental crisis of some U.S. cities. There are groups that have a vested interest in automobiles ranged against groups that feel the auto group's economic claim against society-at-large is getting too large. Then there are antagonisms between rich and poor, between Negro and white, between young and old.

Even a few years ago there seemed to be little hope of reconciliation between these groups. Now there are hopeful signs. The federal government is making an effort to awaken city, county and regional authorities to the fact that chaos will come if public and private systems of transportation are allowed to collapse. Local governments, in some areas, are cooperating with privately operated commuter lines—to at least preserve the service until rational, long range planning and decisions are completed. Even the hostility of the highway planners is diminishing as every new expressway opens to more rush-hour traffic than it can handle. "Balanced city transportation systems are going to be absolutely necessary if auto ownership is to remain a pleasurable experience to Americans in cities," is the statement of a petroleum industry leader.

Rapid transit costs far less

The crisis is both real and threatening. Leland Hazard, a distinguished business and civic leader in Pittsburgh, speaking to the 1965 Carnegie Conference, noted that any large city that says "come one, come all by private automobile," will spend twice what a rapid-transit system costs "and will get for the expenditure only additional immobilization on the streets of the city's center." Richard K. Mellon, president of T. Mellon & Sons and chairman of the committee planning the international conference on urban transportation, says, "The problem of developing balanced urban transportation systems is one that major cities the world over must solve."

Just how critical and how expensive is this environmental crisis of cities? It can be measured by the rundown given to participants at the Texas conference by one of the nation's foremost experts on urban transportation—George L. DeMent, president of the Institute for Rapid Transit and chairman of the board of the Chicago Transit Authority (and also an engineer who presided over most of Chicago's expressway network). DeMent said 36 growing U. S. cities and metropolitan areas should be planning now for balanced transportation systems encompassing highways, buses, commuter trains, subways and separated right-of-way rapid-transit systems. These 36 cities are in addition to five major cities (New York, Chicago, Philadelphia, Boston and Cleveland) which are already improving and expanding existing rapid-transit systems. In addition, DeMent called attention to San Francisco and Washington, D. C. where new rapid-transit systems are being built and to Atlanta where a new rapid-transit authority has been created.

There is spreading realization in political, business and engineering circles that Lewis Mumford was a prophet when he commented, "If the expressways that we have built around our cities are to function as such, mass transit must be improved and widened, not permitted to go out of existence." Railroad men, constituting as they do the largest group of mass transportation experts in the country, will do well to be alert to the railroad opportunities that exist in the situation.

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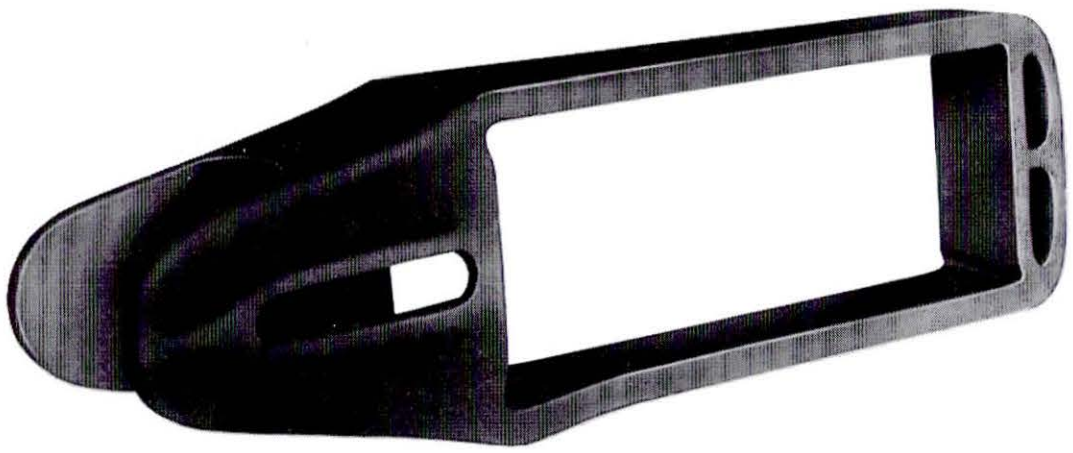

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